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TRAFFIC ACCIDENTS TO CHILDREN*

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IN AN ATTEMPT to assess the morbidity due to traffic accidents, data were collected for a 12-month period on all patients coming to the Montreal General Hospital and Montreal Children's Hospital with injuries sustained as the result of traffic accidents, either as pedestrians or as drivers or passengers of vehicles. It was apparent that the type of accidents involving children differed considerably from that in adults, and for this reason the data have been analyzed separately. The purpose of the study was to discover the number of patients injured in traffic who came to these hospitals and to ascertain what proportion of all the traffic accident injuries in the city of Montreal they represented, and what the consequences of the injuries were. The findings of the first six months at the Montreal General Hospital have already been reported,[1] and the present paper is limited to the patients treated at the Montreal Children's Hospital.

From October 1957 to September 1958, a total of 389 children involved in traffic accidents was treated, and 125 or about one-third of these were admitted to wards. In 72 cases (18.3%) the accident occurred outside the city limits, and 317 were injured in the city. There were two deaths, both in children from out of town. Monthly summaries of all traffic accidents which occurred within the city limits were provided by the Montreal Police Department. These showed that in the City of Montreal in the same period of time 2898 children (under 15 years) were injured and 18 were killed. Thus 10.9% of all children injured in the city were seen at the Montreal Children's Hospital, but this percentage varied from 6.9 to 15.5% in different months (Table I). It is not known whether the other 89% of children injured all required hospital treatment, or whether those killed died in hospital. Therefore, it cannot be assumed that this sample is representative of all traffic accidents to children. Bias is also produced by referral of more seriously injured cases from hospitals which have not complete services for children. On the other hand, because neurosurgery is not practised at the Montreal Children's Hospital, some of the patients with serious head injuries may have been taken directly to the Montreal Neurological Institute.

TABLE I.—COMPARISON OF TOTAL TRAFFIC ACCIDENT INJURIES IN CHILDREN UNDER 15 YEARS OF AGE IN THE CITY OF MONTREAL WITH CITY INJURY CASES TREATED AT THE MONTREAL CHILDREN'S HOSPITAL OCTOBER 1957 TO SEPTEMBER 1958

	Police reports for under 15 years of age	*% of all ages*	*Montreal Children's Hospital*	*% of total child injuries*
October	202	26.5%	24	11.8%
November	154	16.5%	24	15.5%
December	164	18.9%	16	9.7%
January	101	16.3%	7	6.9%
February	113	19.9%	8	7.1%
March	147	25.5%	15	11.0%
April	320	37.4%	43	13.4%
May	374	36.9%	48	12.8%
June	357	37.0%	32	8.9%
July	300	33.0%	34	11.3%
August	324	29.7%	44	13.5%
September	342	30.2%	24	7.0%
Total	2898	25.9%	317	10.9%

SEASON OF YEAR

There is considerable variation in the volume of traffic accidents at different times of the year. This is a reflection of our climatic conditions, as children stay outdoors for shorter periods in cold weather, and therefore are less exposed to the dangers of traffic. Also, older children are in school part of the day. When the spring comes there is a sudden increase in the number of accidents. This applies to the whole city as seen in police reports, as well as to the Montreal Children's Hospital. From April to September the ratio of children to adults involved in traffic accidents in the city was constantly higher than in the winter months (Table I).

TYPES OF ACCIDENT

Table II shows that *pedestrian accidents* predominated, numbering 324 or over four-fifths of the total 389. Slightly more than one-third of the

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TABLE II.—TYPES OF ACCIDENT

	Number of Patients	*% of total*	*Number admitted*	*% admitted*
Pedestrian	324	83.3%	112	34.6%
Vehicle:				
Bicycle	31	7.8%	4	16.7%
Passenger	33	8.5%	8	25.8%
Driver	1	0.3%	1	100.0%
Total	389	100.0%	125	32.1%

pedestrians were admitted to hospital for treatment. Thirty-three or less than 10% were passengers in automobiles, 31 were bicycle (or tricycle) riders, and one was a driver. This latter was a boy of 15 years driving a truck alone, and involved in a collision with a car. He was not a licensed driver, as he was two years under the legal age in this province.

There were no bicycle accident cases between December and March, when the snow and winter road conditions make bicycle riding almost impossible.

TABLE III.—TIME OF ACCIDENT

	Pedestrian	*Bicycle*
12 - 3.59 a.m.	0	0
4 - 7.59 a.m.	0.6%	0
8 - 11.59 a.m.	12.8%	19.4%
12 - 3.59 p.m.	35.2%	19.4%
4 - 7.59 p.m.	43.9%	35.4%
8 - 11.59 p.m.	4.4%	25.8%
Not stated	3.1%	0

TIME OF ACCIDENT

The majority of pedestrian accidents occurred in the afternoon, especially between 4 p.m. and 8 p.m. (Table III). This is probably due to the larger population at risk when the children are out of school. Relatively few occurred after 8 p.m. or early in the morning. In bicycle accidents, though the total numbers are too small to draw any conclusions, a higher percentage was after 8 p.m., a finding probably related to the older age of these patients, and greater exposure to risk during these later hours.

TABLE IV.—AGE AND SEX OF PEDESTRIAN PATIENTS

Age	*Male*	*Female*	*Total*
under 1 year	0	0	0
1 year	1	0	1
2 years	7	6	13
3 "	21	15	36
4 "	32	10	42
5 "	26	13	39
6 "	28	18	46
7 "	37	12	49
8 "	15	13	28
9 "	16	3	19
10 "	9	4	13
11 "	7	5	12
12 "	11	2	13
13 "	1	1	2
14 "	6	1	7
15 "	1	1	2
Total	220	104	324

TABLE V.—AGE AND SEX OF BICYCLE RIDER PATIENTS

Age	*Male*	*Female*	*Total*
4 years	1		1
5 "	1		1
6 "	0		0
7 "	1		1
8 "	3		3
9 "	4		4
10 "	2	1	3
11 "	3		3
12 "	5	1	6
13 "	5		5
14 "	2		2
15 "	2		2
Total	29	2	31

AGE AND SEX OF PATIENTS

Boys outnumbered girls in pedestrian accidents more than 2:1 for all ages, and 3:1 at the age of seven, where the incidence of accidents was greatest for males (Table IV). The peak for girls was at six years of age and lessened sharply after eight years.[2]

In bicycle accidents there were only 2 girls out of 31 such accidents (Table V). There are no controls to indicate the probable population at risk, but it seems unlikely that male cyclists so greatly outnumber female in this age group.

The sex ratio of injured passengers was equal, and the age scatter unremarkable (Table VI).

TYPES OF INJURY

Treated as Outpatients:

Of the 389 injuries, 264 were treated in the Casualty Department. The majority of these were minor injuries, such as contusions and abrasions. However, 154, more than half, were examined radiographically, and 15 (5.7%) had fractures which could be treated on an outpatient basis: six clavicle, two radius and ulna, two radius, one metacarpal, one tibia, one fibula, one left ischium and one skull. One patient had two fractures. The patient with the fracture of the skull would

TABLE VI.
AGE AND SEX OF AUTOMOBILE PASSENGER PATIENTS

Age in years	*Male*	*Female*	*Total*
Under 1	2	1	3
1	0	0	0
2	2	2	4
3	1	3	4
4	1	0	1
5	3	2	5
6	2	1	3
7	1	4	5
8	1	0	1
9	0	0	0
10	2	1	3
11	0	1	1
12	0	0	0
13	1	1	2
14	0	0	0
15	0	0	0
16	1	0	1
Total	17	16	33

TABLE VII.—NUMBER OF INJURIES BY BODY AREA AND CATEGORY OF PATIENT
ADMITTED CASES, MONTREAL CHILDREN'S HOSPITAL

Area injured	*Pedestrians (112 patients)*	*Passengers (8 patients)*	*Bicycle (4 patients)*	*Driver (1 patient)*	*Total*
Head	88	8	3	1	100
Neck and cervical spine					0
Thorax and thoracic spine	8	1			9
Abdomen, pelvis and lumbar spine	9				9
Upper extremity	18	3			21
Lower extremity	35		3		38
Total injuries	158	12	6	1	177
% dangerous injuries	7.6%	17.7%	16.6%	100%	9%
% fatal injuries	1.3%	0	0	0	1.1%

normally have been admitted for observation, but this was one case where x-ray examination was not done in Casualty but at the time of the child's returning for re-examination in the Surgical Clinic. Since he was asymptomatic it was considered that he could remain at home.

Twenty-two patients (8.3%) had lacerations requiring sutures. Tetanus toxoid was routinely given to all with dirty wounds.

ADMITTED CASES

A total of 125—112 pedestrians, eight passengers, four bicycle riders, and one driver—was admitted to hospital for treatment (Table II). As neurosurgery is not practised at the Montreal Children's Hospital, eight cases were transferred from Casualty to the Montreal Neurological Institute, and five others were transferred after a few days' observation. These have all been included in the analysis.

Of the admitted cases, 40 (32%) were from accidents which occurred outside the city. Compared with 18.3% of out-of-town cases in the total treated, this indicates the tendency to bring more serious cases to a larger hospital.

There were two fatal head injury cases, both from outside towns; 16 were dangerous injuries.

In analyzing for the site injured (Table VII), head injuries were found to be the most frequent with 100 (80%) of the 125 admitted cases as injuries involving the head. Lower extremity injuries were next in frequency (30.4%); pedestrians and bicycle riders, the casualties.

In 1955, Murphy[2] reviewed 103 consecutive cases admitted to the Montreal Children's Hospital with injuries sustained as a result of traffic accidents. These admissions were between January 1, 1953, and December 31, 1954, i.e., a two-year period. Apart from the considerable increase in the number of patients, the findings of 1953 to 1954 were very similar to those of 1958.

LENGTH OF STAY IN HOSPITAL

The average time in hospital for 123 patients (omitting two fatal cases) was 9.8 days. This varied from one day to 102 days. Many patients with concussion are admitted for observation, and if the vital signs remain stable, are discharged after a few days. In all, 60 patients were in hospital for less than one week; 19 were in for longer than three weeks. Lower extremity fractures required the longest time. But even the duration of hospital treatment does not give a true picture of the length of restricted activity. The policy of the hospital is to return children to their homes as quickly as possible, and they may be confined to bed at home after discharge. One boy with a compound fracture of the femur was 69 days in hospital, one month further of bed rest at home, a month on crutches without weight-bearing, and then on limited weight-bearing, so that six months' treatmen was required before he could return to normal activity, and even then he was still restricted as to sports.

The longest hospital stay was that of a boy who suffered severe compound fractures of both legs, necessitating amputation of the left. Delay in healing of the stump occurred. He was given physiotherapy during the 102 days in hospital. After spending a month at home he was readmitted for four days in order to learn crutch-walking. Then six months after the accident he obtained an artificial limb, and spent ten days in hospital learning to walk correctly.

SERIOUS INJURIES AND DISABILITIES

The most serious disabilities were in the above-mentioned 14-year-old boy with bilateral compound fractures of tibia and fibula, and an above-knee amputation of the left, and in a 12-year-old boy with severe head injury resulting in a right hemiparesis, who is still being treated in the rehabilitation services. There was one case of a ruptured liver, and one of a ruptured spleen which had to be removed.

The residual effects of head injuries are difficult to assess. Electroencephalograms were taken on 53 of the head injury cases—49 before leaving hospital and four after discharge. Examinations were repeated on 15 cases. Ten were normal or border-line normal on first examination, and three returned to normal. Excluding 11 with mild irregularities, one known epileptic, and one with a proven hæmatoma who was not re-examined, there remain 27 with an abnormal EEG possibly due to the cerebral contusion (Table VIII). However, we do not know

TABLE VIII.—ELECTROENCEPHALOGRAM FINDINGS ON HEAD INJURY CASES

Total cases tested	53
Normal	13
Known epileptic	1
Hæmatoma	1
Mild irregularity, probably returned to normal	11
Abnormal	27

whether they had a normal EEG *before* the accident. The only conclusion that can be drawn is that 50% with abnormalities is higher than the 20 to 30% abnormal records which have been found in control subjects at this hospital in epilepsy research.[3] Of those with an abnormal EEG only the boy with hemiparesis showed a physical disability. Personality changes have been complained of by parents in two cases, though this might be an aggravation of a pre-existing condition. Another person who was brought back with similar complaints had previously been a patient in the department of psychiatry.

CAUSES

It is apparent from the age distribution of patients that the largest number of accidents occur in children who are playing on the street and wander on to the road, or cross without looking for cars. Though complete information was not always recorded, many reports showed that the child was in front of the home or on the street on which his home was located. Impulsive behaviour of children accounts for others, even in older age groups. One 14-year-old boy, who had a serious head injury with epidural hæmatoma, was not hit, but *ran into* the side of a truck just outside the school yard. An eight-year-old boy incurred a bad fracture of the femur when he got out of his parents' car and, without looking, darted out in front of the car to run across the street. His parents said that the driver "didn't have a chance" to avoid hitting him.

On the other hand the boy who had the amputation was standing on the sidewalk in a small town, when a car skidded on wet tar and crashed into him.

Responsibility lies both with parents to supervise and educate their children, and with drivers to observe school areas and pedestrian crossings, and to drive with caution in residential areas where children may be playing.

COMPARISON WITH OTHER TYPES OF ACCIDENTS TO CHILDREN

From the emergency reports at the Montreal Children's Hospital, comparison was made between the number of patients from traffic accidents and the total number of accident patients (exclusive of poisonings). Three months were compared—the month before the start of the study (September 1957), the month with a sudden increase in number of patients from traffic accidents (April 1958), and that with the largest total number of traffic cases (August 1958). Of the total traumatic cases the percentage of traffic accident patients was 10.3%, 13.7% and 11.7%. This indicates that traffic accounts for a relatively small percentage of the total accidents to children, though it would be unwise to minimize its importance.

DISCUSSION

Accidents are the leading cause of death in Canada in the age group one to 15 years. The extent of permanent disability and economic loss through prolonged hospital stay in non-fatal accidents is not accurately known.

Traffic accidents are of importance because with increasing numbers of motor vehicles, as well as population growth, the risk increases, and unless control measures are enforced there will be additional needless morbidity and mortality.

Further study is being undertaken on a city-wide basis using epidemiological techniques as recommended by the WHO Advisory Group: "Fact-finding is basic to the development of accident-prevention programs. Morbidity studies are necessary as a complement to mortality data. The use of epidemiological techniques for fact-finding is recommended, especially in connection with morbidity studies. Emphasis is placed on relating the incidence of accidents to the population at risk and, whenever possible, to the frequency of the hazard to which the individual is exposed. In assembling information on accidents, stress should be laid on reporting the chain of events or circumstances which led up to the actual traumatic event; information about social circumstances (e.g., overcrowding) and the physical and emotional condition of those involved in the accident is of value for research purposes."[4]

SUMMARY

A 12-month study of morbidity due to traffic accidents was carried out at the Montreal Children's Hospital. Of 389 children involved four-fifths were *pedestrians*, more than one-third of whom were admitted to hospital. There were two deaths and two have permanent disabilities. *Head injuries* were the most frequent cause of admission to hospital, and also resulted in two fatalities and one permanent disability. Injuries were more frequent in boys than in girls. However, as automobile passengers, the sex ratio was equal.

Traffic accidents accounted for about one-tenth of all the traumatic cases treated at the Montreal Children's Hospital. Though hospital data do not provide an unbiased sample of the city traffic accident cases, it is apparent from the predominance of pedestrian injuries both in children and in adults that in this city they should be the subject of more detailed investigation.

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RÉSUMÉ

Cet article étudie la morbidité attachée aux accidents de la circulation; il est le résultat d'une enquête poursuivie pendant un an à l'Hôpital des Enfants de Montréal. Des 389 enfants sur laquelle elle portait, 324 étaient des piétons dont 125 durent être admis à l'hôpital. On compta parmi eux deux morts et deux cas d'infirmité permanente. Les blessures à la tête furent la cause la plus fréquente d'admission à l'hôpital. Comme piétons, deux fois plus de garçons furent blessés que de filles mais comme passagers d'automobile la proportion fut la même dans les deux sexes.

Les accidents de la route représentent environ 10% de tous les cas de traumatismes traités dans cette institution. Ils sont sujets à une variation quotidienne et saisonnière. Le plus grand nombre se produit entre quatre et huit heures du soir; l'hiver est la saison creuse tant à cause de la température inclémente qu'à cause des études scolaires qui gardent les enfants à l'intérieur des maisons les rendant ainsi moins exposés. L'impulsivité semble être à la source de la majorité de ces accidents: l'enfant se précipite dans la rue sans regarder si le chemin est libre.

Même si les données recueillies à l'hôpital n'offrent pas un échantillonnage absolu des accidents de la circulation dans cette ville, il est évident d'après le nombre de piétons enfants ou adultes qui sont atteints, qu'elles devraient faire l'objet d'une enquête plus approfondie.

THE ROLE OF HYPERTENSION IN THE PROGRESSION OF ATHEROSCLEROSIS*

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INCREASED intra-arterial pressure is generally regarded today as an important factor in the acceleration of pre-existent atherosclerosis.[1] However, except for the well-known atherogenic effects of pulmonary hypertension, the evidence for this acceleration is nearly all of the indirect type. Most of it, in fact, is concerned with the relationship of hypertension to clinical coronary artery disease, not to coronary atherosclerosis *per se*. Even with clinical coronary artery disease, certain inconsistencies are apparent. For example, it has been stated on good authority that "there are a number of populations in which hypertension is not uncommon, whereas the prevalence of ischæmic heart disease is nevertheless relatively low."[1] Furthermore, hypertensive disease is said to be more prevalent in middle-aged American women than in men, but the opposite is the case for atherosclerotic disease, particularly coronary artery disease.[2] And if one admits that hypertension does in fact accelerate the atherosclerotic process, no evidence is at hand to show how much it accelerates the disease or how the acceleration is produced.

We have now had an opportunity to investigate these rather obscure matters. In our continuing long-term study on the relationship (or lack of relationship) between the ante-mortem serum lipid levels and the accumulation of fat in the arteries of human subjects,[3-6] information has also become available concerning the effect of hypertension on these accumulations. Our experimental series is made up of 800 male patients who are permanently confined to hospital, and in each of these, in addition to the serial determinations of the serum lipids, blood pressure recordings had usually been made intermittently over many years. We have now compared these blood pressure levels with the amount of arterial lipid in 184 fatalities in the series.

MATERIAL AND METHOD

The experimental series and the technical details concerning the serum lipid determinations have been described in detail in our previous reports on the lack of relationship between the ante-mortem serum lipid levels and the post-mortem severity of atherosclerosis.[3-6] Up to April 1959, there were 184 patients in the age group 50-89 years who had died and in whom the severity of atherosclerosis had been determined at autopsy. In each instance, the entire epicardial portions of the coronary arteries were removed from the heart, opened longitudinally with scissors, stripped of their outer medial and adventitial coats to remove contaminating fat, and sent to the chemistry laboratory for analysis. Although the length and width of the samples from the coronary vessels varied considerably between individuals, our stripping procedure was such that we can state with assurance that all intimal lesions in the epicardial portions of the arteries, and their contained lipid, were obtained from each case. The entire sample was used for chemical analysis except a tiny fragment of the largest plaque which was reserved for morphological study. Exactly the same procedure was followed for the abdominal aorta, the cerebral arteries and the left femoral artery. The sample from the abdominal aorta extended from the lower border of the cœliac axis to the bifurcation; that of the cerebral arteries consisted of

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the basilar artery, the circle of Willis and approximately one-half inch of all major branches of these vessels; the sample of the left femoral artery was 12 inches in length, extending distally from the level of the inguinal ligament.

In the chemistry laboratory, the fresh tissues were weighed at once and subjected to alkaline digestion and storage as recommended by Haven and associates.[7] After complete digestion of the tissue, an estimation of the total lipid content was made by the method of the same authors.

After the tissue lipid analyses on the 184 cases were completed, one of us (J.M.) searched the hospital file of each patient and listed all blood pressure determinations recorded during the hospital stay. From these determinations another observer (C.H.L.), who was not aware of the tissue lipid findings, categorized each case as to the presence or absence of diastolic and systolic hypertension. Individuals with diastolic pressures consistently higher than 95 mm. Hg were considered to be "diastolic hypertensives".* Where there were only occasional elevated diastolic pressure recordings the case was ranked as "doubtful diastolic hypertensive". There were 41 of these doubtful cases.

A similar procedure was followed in categorizing each patient for the presence or absence of systolic hypertension. "Systolic hypertensives" were those in whom the systolic blood pressure was consistently 150 mm. Hg or higher. As with the diastolic hypertensive group, there were certain cases (32 cases) which had to be classed as "doubtful systolic hypertensives".

Multiple blood pressure recordings were available in the majority of the 184 cases. The greatest number in any person was 22 recordings over a period of 34 years. However, there were two individuals who had had only two blood pressure recordings, and one individual with a single recording. These latter cases were not eliminated from the series.

When all of the above data had been compiled and the "doubtful" groups of cases eliminated, the total amount of lipid in each of the four different arteries of the hypertensive cases – systolic or diastolic – was compared with that in the arteries of cases in their respective normotensive groups using Student's t test.[11] An additional comparison was made between the amount of arterial lipid in "pure" normotensives (i.e. both systolic and diastolic pressures were normotensive) with that in "pure" hypertensives (i.e. both systolic and diastolic pressures were hypertensive). P values of less than 0.05 were regarded as being significant, and those equal to 0.05 were considered to be of borderline significance.

*No agreement has apparently been reached on the level at which a diastolic pressure is abnormally high.[8] Levels as low as 80 mm. Hg,[9] or as high as 110 mm. Hg,[10] have been suggested. We chose 95 mm. Hg because it seemed a fair compromise. In any event, our choice was made at the beginning of the study, not after a trend in favour of hypertension had become apparent.

OBSERVATIONS

All cases of definite hypertension or normotension—systolic or diastolic or "pure"—between the ages of 50 and 89 years inclusive were used in the analyses. The mean ages of the systolic and diastolic groups are given in Table I. The difference in mean age of the systolic hypertensives and normotensives was not statistically significant. The diastolic hypertensives and normotensives, however, did show a significant difference in their mean ages. But this has not disturbed us because the difference favoured normotension—that is to say, increasing age should result in an increasing accumulation of lipid in arteries provided all other factors are excluded.

TABLE I.—AGE DISTRIBUTION OF THE SERIES

	Number of cases	*Mean age in years ± S.E.M.*	*P value*
Systolic hypertensives.....	109	73 ± 1	>0.10
Systolic normotensives....	43	71 ± 2	
Diastolic hypertensives....	68	71 ± 1	<0.05
Diastolic normotensives...	75	74 ± 1	

The amount of lipid extractable from the arteries of patients with hypertension (systolic or diastolic) was then compared with the amount in patients with normotension. Significant relationships between systolic hypertension and the amount of arterial lipid were demonstrated in the coronary, cerebral and femoral arteries—but not in the abdominal aorta (Table II). For the diastolic group (Table III) a significant relationship was shown between this type of hypertension and the amount of lipid in the cerebral arteries, and a borderline relationship in the coronary arteries.

In the two analyses summarized in Tables II and III, the normotensive group in the systolic series included some individuals with diastolic labile or hypertensive pressures; similarly the diastolic normotensives contained cases with elevated systolic pressures. Accordingly, we have compared the amount of arterial lipid in "pure" normotensives (i.e., both systolic and diastolic pressures were normotensive) with that in "pure" hypertensives (i.e., both systolic and diastolic pressures were hypertensive). The results of this comparison are given in Table IV and are almost identical with those in Tables II and III. It was also found that the mean ages of the two groups were not significantly different.

In summary, then, significant relationships between hypertension and the accumulation of lipid in arteries were present in seven out of 12 separate statistical analyses, and in the remainder a trend

TABLE II.—TOTAL EXTRACTABLE LIPID FROM DIFFERENT ARTERIES IN SYSTOLIC HYPERTENSIVES AND SYSTOLIC NORMOTENSIVES, AGE 50 - 89 YEARS

	Total lipid in mg. ± S.E.M. (number of cases)			
	Coronary arteries	*Cerebral arteries*	*Femoral arteries*	*Abdominal aorta*
Systolic hypertensives	103.8 ± 7.4 (109)	54.0 ± 4.4 (108)	186.7 ± 12.1 (108)	917.3 ± 59.5 (109)
Systolic normotensives	74.7 ± 7.4 (43)	35.3 ± 4.1 (43)	132.3 ± 15.9 (43)	821.7 ± 89.6 (43)
P value	<0.05	<0.02	<0.02	>0.10

in favour of hypertension was demonstrated. It should be noted, particularly, that significant relationships between hypertension and the amount of arterial lipid were found consistently in vessels that are of the greatest clinical importance—the coronary and cerebral arteries. In some of these the increase in arterial lipid was appreciable: in the cerebral arteries it was almost twice as much in "pure" hypertensives as in "pure" normotensives (see Table IV).

TABLE III.—TOTAL EXTRACTABLE LIPID FROM DIFFERENT ARTERIES IN DIASTOLIC HYPERTENSIVES AND DIASTOLIC NORMOTENSIVES, AGE 50 - 89 YEARS

	Total extractable lipid in mg. ± S.E.M. (number of cases)			
	Coronary arteries	*Cerebral arteries*	*Femoral arteries*	*Abdominal aorta*
Diastolic hypertensives	109.2 ± 10.6 (68)	54.5 ± 5.4 (67)	177.5 ± 15.2 (67)	955.7 ± 81.2 (68)
Diastolic normotensives	85.6 ± 6.2 (75)	37.7 ± 2.9 (75)	155.9 ± 12.8 (75)	829.0 ± 61.4 (75)
P value	=0.05	<0.01	>0.10	>0.10

DISCUSSION

Our choice of the index of total extractable arterial lipid to measure the severity of atherosclerosis needs little defence. We agree, of course, that there is far more to atherosclerosis than the accumulation of lipid; nevertheless, the presence of this material in the arterial intima is a characteristic feature of the disease, and in our hands its quantity has been found to run roughly parallel with the severity of atherosclerosis as measured by crude morphological grading. Other workers apparently have held the same view, notably Faber and Lund[12] and Landé and Sperry.[13]

Assuming that the amount of lipid is a reliable index of severity, the present study has provided information on at least one point: it has confirmed the generally held view that hypertension has an accelerating effect upon the atherosclerotic process, particularly in the coronary and cerebral arteries. The acceleration has been found to be particularly impressive in the cerebral arteries: in one statistical analysis the amount of lipid in these vessels was almost twice as much in hypertensives as in normotensives. However, some readers of this paper may not be as impressed as we are with the degree of acceleration demonstrated in this series. Before the present study, we had been engaged for almost six years in trying to show significant relationships between a variety of so-called atherogenic agents (notably the serum cholesterol levels) and the severity of atherosclerosis. The results were almost entirely negative;[3-6] they were so discouraging that we were beginning to suspect that our technique was either too critical or too elaborate to be of practical use in atherosclerosis research. But now, with the demonstration of definite relationships between hypertension and the amount of arterial lipid in seven out of 12 statistical analyses (and consistently in the coronary and cerebral arteries), we are decidedly impressed—and we have also regained confidence in our experimental procedure.

Several mechanisms might be considered in explaining how the accumulation of lipid in arteries is accelerated by hypertension, but two of them are of particular interest—an increased filtration pressure of the plasma lipid mixture through the arterial wall or an increased tendency for the production of intimal hæmorrhage with the frequent extravasations of lipid-containing blood.

The hypothetical mechanism of increased plasma lipid filtration from hypertension will be discussed first. Experiments by Wilens,[14] in which excised human arteries were perfused under pressure with serum lipid mixtures, indicated that these mixtures diffused through the arterial wall and could be recovered, though with a decreased lipid content, outside the vessels. Furthermore, lipids were found to be deposited in the arterial wall. From these experiments it might be deduced that the deposition of lipid in arteries is dependent partly on the intra-arterial pressure and partly on the

TABLE IV.—TOTAL EXTRACTABLE LIPID FROM DIFFERENT ARTERIES IN "PURE" HYPERTENSIVES AND "PURE" NORMOTENSIVES

	Total lipid in mg. ± S.E.M. (number of cases)			
	Coronary arteries	*Cerebral arteries*	*Femoral arteries*	*Abdominal aorta*
"Pure" hypertensives	113.0 ± 11.0 (64)	57.9 ± 3.5 (63)	184.0 ± 15.7 (63)	975.6 ± 85.2 (64)
"Pure" normotensives	79.4 ± 8.5 (35)	30.4 ± 3.7 (35)	135.5 ± 17.3 (35)	863.4 ± 103.6 (35)
P value	<0.05	<0.01	>0.05	>0.10

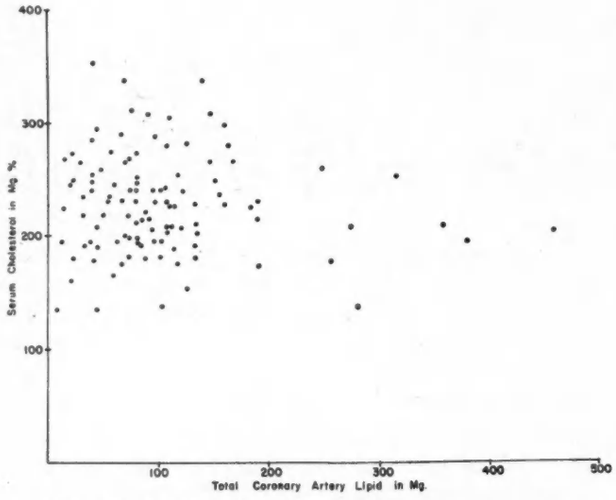

Fig. 1.—Total coronary artery lipid and serum cholesterol levels in patients with systolic hypertension, 50-89 years of age.

serum lipid concentration. The importance of intra-arterial pressure has been confirmed in the present study, but from additional observations made in our long-term project we do not believe that the serum cholesterol concentration was of much significance. Serum cholesterol levels had been estimated serially during life in each of the cases in the present series. The mean level was the same in the 109 systolic hypertensives as in the 44 systolic normotensives (228 mg. % ± 4 S.E.M., and 228 mg. % ± 6 S.E.M., respectively). And when the levels of serum cholesterol in systolic hypertensives were plotted against the amount of lipid in their coronary arteries (see Fig. 1) no relationship was found. In this analysis, in which the effect of the variable of blood pressure was minimized, the correlation coefficient gave a negative value (—0.07), a result which does not lend support to the theory that the more cholesterol there is in the blood the more lipid there will be in the arteries. These are the reasons why we do not believe that the level of serum cholesterol had much to do with the acceleration of atherosclerosis in the hypertensives in our present series.

We are much more intrigued with the possibility that hypertension accelerates the atherosclerotic process simply because it favours the production of intimal hæmorrhage. One mechanism by which intimal hæmorrhage may be produced has been reviewed elsewhere by one of us (J.C.P.),[15, 16] and it will only be summarized here. Since intimal hæmorrhages are intrinsic lesions within atherosclerotic plaques, their origin must obviously be from the rupture of capillaries that can be demonstrated in the immediate neighbourhood of the extravasated blood. These capillaries are peculiar in that they arise directly from the lumen of the artery, the pressure in which should be reflected in the capillaries. Theoretically then, the pressure within these small channels, and their tendency to rupture, should be greater in hypertensives than in normotensives. We have recently presented evidence that hypertension does, in fact, have this capillary-rupturing effect:[17] using a simplified cool-dry clearing technique developed by Moffatt,[18] a highly significant increase in the incidence of fresh intimal hæmorrhages in the aorta has been found in hypertensive persons compared with that in normotensives. Other recent reports from our laboratories indicate that intimal hæmorrhage is an extremely early feature of the atherosclerotic process. Deposits of hæmosiderin, presumably derived from hæmorrhage, have been demonstrated in the earliest lesions (in fatty streaks)[19] and we have also shown what appears to be intimal vascularization in these earliest lesions.[20] Thus, the hæmorrhage-producing properties of hypertension may operate in early lesions as well as in late ones, in young persons as well as in the elderly.

The way in which intimal hæmorrhage accelerates the atherosclerotic process, provided it is repetitive, is not difficult to understand. The gradual accumulation of the solid elements of the extravasated blood within the intima, notably the blood lipids[21] and the products of hæmoglobin degradation,[19, 22] should cause a perceptible increase in the size of each plaque. Again, the organization of each hæmorrhage should result in a progressive increase in the fibrous tissue component of an individual lesion. And in the process of organization a proliferation of new capillaries must also occur, and these newly formed channels should be susceptible in turn to rupture. Thus, as Ogilvie remarks, "Vascularization of the intima initiates a vicious circle whereby hæmorrhage stimulates repair and repair predisposes to hæmorrhage."[23] The accelerating effect of mural thrombus deposition, as stressed by Duguid,[24] should also be recognized, and the initiation of the larger of these thrombi, as well as of occluding thrombi, may well be the direct result of injury from the disruption of tissue by hæmorrhage into plaques. In this regard, one of us (J.C.P.) has reported that intimal hæmorrhages can be identified at the sites of precipitation in the great majority of occluding coronary thrombi,[15] an observation that has been confirmed recently by Helpern and Weinberg.[25] This in brief is the vascularization theory of atherosclerosis, a theory that is now receiving more attention than it has during the past ten years.[26]

We are not suggesting that intimal hæmorrhage is responsible for the initiation of atherosclerosis. There is no evidence that capillaries are present in the intima of normal human arteries; thus, some other factor is probably responsible for the initial lesions of the disease. But once these lesions occur —and Holman and associates claim that they are present in practically all young persons over the age of three years, regardless of race, sex, blood pressure, serum lipid levels or nutritional status[27]— they may, and do, become invaded by capillaries. And if these capillaries rupture and produce intimal hæmorrhages, the stage will then be set for the conversion of an innocuous lesion into one

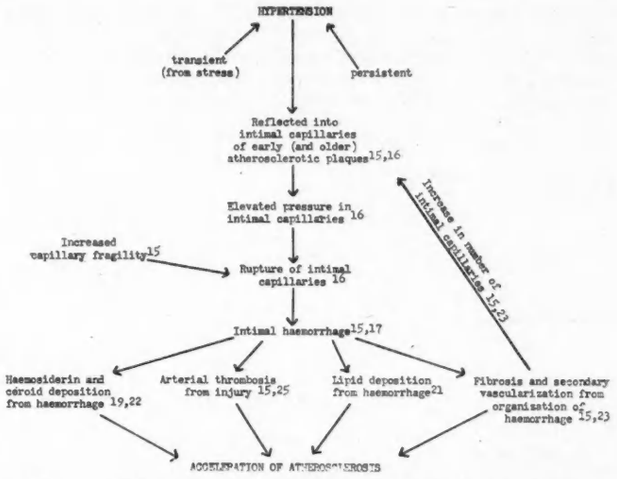

Fig. 2.—Schematic representation of hypothetical relationship between hypertension, intimal hæmorrhage and atherosclerosis.

that may progress eventually to casualty-producing proportions. From the evidence obtained previously in our laboratories, and in the present study, we suggest that the mechanism of progression of the disease may be like that shown in Fig. 2. The principal accelerating factor in this scheme is hypertension, especially persistent hypertension; nevertheless, transient elevations of blood pressure from physical or emotional stress should have a similar, though lesser, effect. Friedman and Rosenman[28] have recently reported that clinical coronary artery disease is seven times more frequent in men who by temperament are addicted to lives of emotional stress than in men with converse behaviour patterns. They imply that this difference may have resulted from the elevation in serum cholesterol levels and the hastening of blood clotting times that occur in chronically stressed individuals. This may be true, but we suggest that emotional stress may have another effect—transient hypertension—and that each bout of transient hypertension thus produced may cause capillary rupture, intimal hæmorrhage, and acceleration of atherosclerosis.

If the chain of events illustrated in Fig. 2 is accepted, the prevention of end-stage atherosclerosis will probably only be achieved by finding ways to break the sequence at one or more vulnerable points. Three promising lines of investigation might be suggested: (1) searching for new and better hypotensive agents for the control of essential hypertension; (2) locating, and eliminating if possible, those stressful influences that cause transient and severe elevations in blood pressure; and (3) finding agents which will so strengthen intimal capillaries that they resist dilatation and rupture even when exposed to high pressures. These are merely suggestions; they do not preclude the possibility that factors other than hypertension may also be important in the rupture of intimal capillaries, in particular those that cause increased capillary fragility. Research on these, too, is urgently needed. But even if capillaries are diseased, their rupture must depend in part upon the pressure to which they are exposed: a rotten garden hose rarely breaks and leaks when the tap is turned off.

SUMMARY AND CONCLUSIONS

The severity of atherosclerosis, as measured by the amount of lipid extracted from the coronary, cerebral and femoral arteries and abdominal aorta, has been determined in each of 184 fatalities in a large series of patients who are permanently confined to hospital. The severity of disease thus determined has then been compared with the presence or absence of hypertension during each patient's hospital stay.

Significant relationships between hypertension and the severity of disease have been found in seven out of 12 statistical analyses; and they were demonstrated consistently in the two vessels of greatest clinical importance—the coronary and cerebral arteries.

The mechanism by which hypertension accelerates the atherosclerotic process is discussed, and it is suggested that it lies in the increased tendency of hypertensives to rupture intimal capillaries and produce intimal hæmorrhages.

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RÉSUMÉ

Ce travail fait suite à un autre publié la semaine dernière dans ce journal sur un sujet connexe. Dans des circonstances expliquées antérieurement le degré d'artériosclérose déterminé d'après la quantité de lipides extraite des artères coronaires, cérébrales, fémorales et de l'aorte abdominale dans 184 autopsies, fut comparé à la présence (ou à l'absence) d'hypertension telle qu'on l'avait observée au

cours des années de la vie de ces sujets. Un degré important de corrélation fut obtenu à sept reprises dans 12 analyses statistiques. Cette corrélation se manifesta surtout dans les deux groupes d'artères possédant la plus grande importance clinique: à savoir, les cérébrales et les coronaires. Des expériences ont montré que la déposition de lipides dans la paroi d'une artère dépend en partie de la pression intra-artérielle et en partie de la concentration lipidique du sérum. Dans l'étude présentée ici on n'obtint aucune corrélation entre la cholestérolémie et la quantité de lipides extraite des artères. Les auteurs croient que le mécanisme par lequel l'hypertension accélère le processus athéromateux réside dans la tendance à se rompre qu'ont les capillaires de l'intima chez les hypertendus, donnant ainsi lieu à des hémorragies dans la tunique interne. Ces hémorragies itératives engendrent un cercle vicieux par lequel la réparation est suivie de revascularisation et d'autres hémorragies.

CIRCULATORY ADJUSTMENTS IN THE INITIAL NEONATAL PERIOD*

JAMES A. LOW, M.D., M. M. SPIVAK, M.D. and J. E. KAPSOS, M.D., *Toronto*

MANY SYSTEMIC adjustments occur in the initial neonatal period, particularly in relation to the respiratory and circulatory systems. A number of authors have drawn attention to the variability of hæmatological values in venous and capillary blood at and subsequent to delivery,[1-5] comparable to those observed in the present series. This part of the study is a further effort to clarify the extent and significance of these variations.

PROCEDURE

The series consists of infants born to normal obstetrical patients. The cord was double-clamped within two minutes, so that all cases represent the results of early clamping of the cord. The method of sampling and procedures of estimation have been outlined in Part 1 of this study (*Canad. M. A. J.*, 82: 12, 1960).

In order to appraise changes occurring during the initial 24 hours and variations in different parts of the circulation, two groups of ten cases have been studied. In all cases, estimations were made on blood taken from the umbilical vein at delivery and from the heel capillary system within the first hour and at 24 hours. In Group A simultaneous estimations were made on femoral vein blood in the first hour, while Group B had similar estimations at 24 hours (Table I).

TABLE I.

Group A	*Delivery*						*24 hours*	
	Umbilical vein		*Heel capillary*		*Femoral vein*		*Heel capillary*	
	Hb.	*Ht.*	*Hb.*	*Ht.*	*Hb.*	*Ht.*	*Hb. in g. %*	*Hæmatocrit*
J.G.	14.6	52	18.8	66	16.2	60	17.6	57
D.K.	15.0	51	20.2	67	16.4	56	19.3	66
D.W.	15.6	53	17.9	63	16.9	58	17.9	60
F.MacD.	15.7	51	18.6	65	16.3	54	20.1	68
H.K.	16.6	55	18.6	63	17.6	61	20.7	71
V.B.	13.7	49	15.5	56	14.6	54	14.9	53
D.K.	15.4	51	17.9	58	16.6	51	15.4	49
E.C.	15.6	52	20.7	64	18.6	62	18.5	58
E.S.	16.6	53	19.0	66	17.9	59	19.0	66
E.W.			19.7	64	18.2	61		
	15.4	52	18.0	63.2	16.9	57.6	18.1	61

Group B					*Femoral vein*			
					Hb.	*Ht.*		
M.D.	17.4	60.5	18.9	62.5	18.4	60	20.2	63.5
R.H.	15.0	49.0	18.4	61.5	17.3	58	18.4	60
F.F.	16.1	57.5	20.2	67	18.2	60	18.4	60
E.G.	15.2	52	18	61.5	16.6	58	17.9	56
D.T.	13.3	48.5	15	54	14.4	49	14.4	51
S.M.	17.3	60	21	67.5	19	65	19.1	66.5
V.S.	16.2	54	21.2	71	17.7	60	18	60.2
E.C.	16.7	58.5	19.5	68	17.5	56	18.4	59.5
A.F.	13.5	47	16.7	57	13.3	43.5	14.8	46.5
B.N.	13.1	47	16.4	56	16.6	59	18	63
	15.4	53.4	18.5	62.6	16.9	56.9	17.8	58.6

*From the Department of Obstetrics and Gynæcology, University of Toronto and Toronto General Hospital.

TABLE II.

Group A		*Hb. in g.%*	*Hæmatocrit %*
Delivery.....	Umbilical vein	15.4	52
1st hour.....	Femoral vein	16.9	57.6
	Heel capillary	18.7	63.2
24 hours.....	Heel capillary	18.1	61
Group B		*Hb. in g.%*	*Hæmatocrit %*
Delivery.....	Umbilical vein	15.4	53.4
1st hour.....	Heel capillary	18.5	62.6
24 hours.....	Femoral vein	16.9	56.9
	Heel capillary	17.8	58.6

TABLE III.—SCHEMATIC REPRESENTATION OF CIRCULATORY RELATIONSHIPS STUDIED

	Relationships studied	
	General circulation	*Peripheral circulation*
Delivery....	Umbilical vein	
1st hour.....	Femoral vein ⟷	Heel capillary
24 hours....	Femoral vein ⟷	Heel capillary

RESULTS

In all cases the same hæmatological pattern was followed, although the results in the individual patients extend over the range seen in the normal series. The mean levels for the two groups of cases are recorded in Table II.

Although Groups A and B are not the same patients, the method of study was identical, and it is apparent from examination of the mean levels of umbilical vein and heel capillary blood that they are highly comparable groups. These figures correspond closely with the mean levels in the total series. This is necessary in appraisal of femoral vein blood changes during the initial 24 hours.

Four relationships schematically outlined in Table III warrant study. They are: (1) umbilical vein and femoral vein values within the first hour; (2) femoral vein and heel capillary values within the first hour; (3) femoral vein and heel capillary values at 24 hours, and (4) femoral vein values within the first hour and 24 hours.

DISCUSSION

1. *Umbilical Vein and Femoral Vein Blood Differences*

The mean levels were: (1) umbilical vein hæmoglobin 15.4 g. % and hæmatocrit 52.1%; (2) femoral vein hæmoglobin 16.9 g. % and hæmatocrit 57.6%. This represents an increase in values for the femoral vein blood over the umbilical vein blood of 1.5 g. hæmoglobin per 100 ml. and 5.5% hæmatocrit.

These cases represent early clamping of the cord. The two veins are essentially comparable except for a possible disturbance of circulation during placental separation. Since the cord is clamped, there can be no placental effect upon the femoral vein levels subsequent to testing of the umbilical vein. Variations observed are therefore likely due to adjustments within the infant.

The difference between samples from the umbilical and femoral veins is remarkably constant, all but two showing an increase in a hæmoglobin value between 1.0 and 1.5 g. %. This would appear to represent a true hæmoconcentration occurring in the immediate neonatal period.

Such a rapid adjustment probably represents a shift of fluid to the extracellular space. This might be explained by a rise of intravascular pressure associated with the rising blood pressure of the initial neonatal period. Barcroft,[6] in sheep, has demonstrated a distinct rise of arterial pressure in the 30 minutes following delivery. Although the limitations of neonatal blood pressure estimations are well known,[7-10] present evidence does imply a rising pressure in the initial neonatal phase.

2. *Femoral Vein and Heel Capillary Blood Differences in the First Hour*

The mean levels were: (1) femoral vein hæmoglobin 16.9 g. % and hæmatocrit 57.6%; (2) heel capillary hæmoglobin 18.7 g. % and hæmatocrit 63.2%. This represents an increase of values in peripheral blood over femoral vein blood of hæmoglobin 1.8 g. % and hæmatocrit 5.8%.

The femoral vein represents the general circulation in the region from which the capillary blood has been drawn. There is evidently a significant hæmoconcentration in the peripheral circulation. The difference of 1.8 g. % in hæmoglobin levels is an increase of 10%. The individual cases fall into two groups, the first with a difference of 1.0-1.5 g. %, and the second with a difference in excess of 2.0 g. %.

This hæmoconcentration is likely due to stasis in the peripheral vascular bed which may reasonably be expected to show individual variation.

It is apparent that an appraisal on the basis of peripheral skin colour or hæmatological values may lead to misinterpretation of the true state of the infant.

3. *Femoral Vein and Heel Capillary Blood Differences at 24 Hours*

The mean levels were: (1) femoral vein hæmoglobin level 16.9 g. % and hæmatocrit 56.9%; (2) heel capillary hæmoglobin 17.8 g. % and hæmatocrit 58.6%. This represents an increase of values in peripheral blood over femoral vein blood of hæmoglobin 0.9 g. % and hæmatocrit 1.7%.

It is apparent that a peripheral hæmoconcentration remains at 24 hours. The hæmoglobin difference of 0.9 g. % represents an increase of 5%. The individual cases again fall into two groups. In the first group there is no difference between femoral vein and capillary blood levels, while the second group shows a difference of 1.0-2.0 g. %. Thus, although a hæmoconcentration persists in the peripheral circulation, it is reduced by half and in some cases of peripheral vascular stasis has been entirely resolved.

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4. *Femoral Vein Blood within the First Hour and at 24 Hours*

The mean levels were: (1) first hour, hæmoglobin value 16.9 g. % and hæmatocrit 57.6%; (2) 24 hours, hæmoglobin 16.9 g. % and hæmatocrit 56.9%. These values demonstrate that no change occurs during the initial 24 hours.

It is interesting to note the constancy of hæmatological values in the general circulation following the initial neonatal adjustment. Thus, changes which occur in peripheral hæmatological values represent only adjustments of the peripheral vascular circulation.

CONCLUSIONS

A number of circulatory adjustments occur in the normal newborn infant during the initial 24 hours. An immediate hæmoconcentration takes place in the general circulation, possibly due to a rise in blood pressure. There is immediately following delivery a stasis in the peripheral vascular circulation of the order of 10%. This peripheral vascular stasis persists to a limited extent after 24 hours, although it may be entirely resolved in some infants by this time. There are no changes of hæmatological values in the first 24 hours. The variations observed in peripheral blood represent only adjustments of the peripheral vascular circulation.

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RÉSUMÉ

Les auteurs ont étudié les modifications que subit la circulation du sang dans la toute première enfance. Les sujets étudiés étaient des enfants nés de femmes normales et dont le cordon fut clampé moins de deux minutes après la naissance. La différence dans les résultats entre les prélèvements de la veine fémorale et ceux de la veine ombilicale est remarquablement constante ce qui serait l'indice véritable d'une hémoconcentration dans la période néonatale immédiate, probablement par mouvement d'eau vers l'espace extravasculaire sous l'impulsion d'une augmentation de tension artérielle. La comparaison entre le sang de la veine fémorale et celui des capillaires du talon semble indiquer une stase dans le lit vasculaire périphérique à la première heure de vie. A 24 heures l'hémoconcentration peut persister bien que réduite de moitié alors que dans certains cas la stase vasculaire périphérique a complètement disparu.

SHOULD SPONTANEOUS ABORTION BE PREVENTED?*
VITAMIN E IN ITS MANAGEMENT

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UNTIL 50 years ago there was no such problem in medicine as is brought forward in this title. Up to that time it was generally agreed upon in the medical profession that doctors should always preserve life as long as they were able to do so, that they should regularly alleviate distress in any way open to them, and that an early pregnancy in jeopardy was no exception to these rules.

Then a series of studies upon aborted fetuses, arising principally from the Carnegie Institute of Embryology, cast doubt upon the quality of conceptions that threatened to abort. They suggested that a large percentage of these conceptions were "rotten fruit", and that perhaps when the strong wind of Providence shook the blossoming tree of human life we should not raise a hand to steady it.

Let us review the situation in the light of the literature and the writer's experience. In doing so, let us consider in order:

(a) What is spontaneous abortion?

(b) Can it be prevented?

(c) Should it be prevented?

(d) What has vitamin E to offer in its prevention?

Spontaneous Abortion and Miscarriage—Definitions and Incidence

The usual definition is that these terms, spontaneous abortion and miscarriage, refer respectively to the spontaneous interruption of pregnancy up to the 16th and from the 16th to the 28th week of gestation. In most discussions of this particular problem both groups are lumped together, and I will do so here for the most part, since the same etiological factors appear to be involved. The clinical phenomena are bleeding when the placenta detaches and/or the cervix opens; loss of fluid from rupture of the amniotic sac; uterine contractions designed to expel the contents of that organ, and usually associated with low backache; and the collapse of any breast engorgement that may have developed that early. The fetus may die before, during or after this sequence of events, the collapse of the breast enlargement being the earliest clinical indication of this. An even earlier indication is to be found in a decrease in pregnandiol excretion in the urine,[1] or perhaps in abnormal cervical mucus patterns,[2] but the earliest portent of all is a falsely negative pregnancy test accounted for by a low output of chorionic gonadotrophin in the urine.[3]

*Read at the Third World Congress on Fertility and Sterility, Amsterdam, Holland, June 9, 1959.
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There has long been a feeling amongst obstetricians that a threatened abortion has not become inevitable until the cervix begins to dilate. Thereafter any therapeutic measure was bound to be frustrated. The corollary was that up till then there was hope. Hence such an abortion was designated "threatened", and bed rest and avoidance of travel and coitus plus the use of sedatives and certain hormone or vitamin preparations, were properly instituted. How valid is this classic view?

One point that should be made at this juncture is that we have poor data on the true incidence of abortion. Any figures we have are vitiated by the fact that many a pregnancy is not recognized as one until it ends as a particularly profuse "menstruation"; many abortions occur before a physician has been consulted and never enter medical statistics; and finally a fairly large proportion are quietly induced by criminal means and are apt to remain statistically silent.

What is the expectancy of "spontaneous" abortion in pregnancies generally? Recent reports place the figure between 7 and 11%, at an average of 10%.[4, 5] However, such data are usually derived from hospital series and since patients register relatively late the figures could perhaps be expected to represent no more than one-half or two-thirds of the fetal wastage actually occurring in pregnancy. Rock and Hertig believe that about 34% of embryos are lost before pregnancy is recognized as such. However, Hertig and Livingstone's study[6] of 1150 pregnancies in *private* patients in Boston gave a figure for the clinical recognition of spontaneous abortion of 10.6%. About 4% of pregnancies registered at hospital threaten to abort but in private practice this figure can rise to 11 to 16%.

Hertig and Livingstone concluded that 60% of patients diagnosed as threatened abortions abort. Then, on the basis of a study of 1000 such cases they stated that "approximately 60% of threatened abortions *under adequate treatment* may fail to abort", the potential salvage ascribed to any therapeutic measure thus being about 20%.

Can Spontaneous Abortion be Prevented?

Clearly there is not much likelihood that an abortion can be prevented when the cervix is already partially dilated and labour is in progress. However, recent surgical success in closing patulous cervices in late pregnancy would suggest that this may not be a hopeless affair if the cervical dilatation has been chronic, and is not merely an acute episode in the process of expulsion of the uterine contents.

Not many malformed fetuses can be carried to term and perhaps no pregnancies continue on when there is a thoroughly blighted ovum. This latter is relatively common, as Novak[7] and others have indicated, and as experience has revealed. However, it is scarcely accurate for pathologists to examine routine aborted material sent to them and to decide upon that basis alone that the high percentage of abnormality there encountered is representative of all pregnancies threatening to abort.

When such examinations of aborted material are made it must be admitted that the conclusions are pessimistic. Indeed, F. J. Browne mentions that Ballantyne introduced antenatal care with the hope of preventing fetal abnormalities, but later in life resigned himself to their inevitability. In 1834, Granville, describing 45 aborted ova, concluded that the defect was due to chorionic disease based on metritis. Giacomini in 1894 was the first to express the view that threatened abortions should perhaps be encouraged to miscarry. Agreeing with him, Mall concluded that pathological embryos had once been normal, but that nearly all had pathological membranes and had deteriorated accordingly. Of 132 pathological specimens he studied, he reported that fully 113 showed a diseased chorion. He found that localized anomalies were 12 times as common in abortions as among term babies. Teacher also found many aborted ova pathological.

Hertig and Rock,[8] reporting 12 defective embryos among 28 early fertilized ova, found that seven of them were quite abnormal and must inevitably have aborted. Since on the average only 10% of *recognized* pregnancies abort spontaneously, this suggests that many (25% less 10%) must be lost before pregnancy is recognized. They state: "Additions to our collection will contain a smaller proportion of abnormal embryos, for *subsequent growth in those which appear abnormal could re-establish normal structures.*" The emphasis here is mine, but surely this is a significant statement when made by such eminent investigators. Randall *et al.*[9] suggest that "perhaps many so-called abnormal ova have been due to inadequate nutrition of the early conceptus", and doubt that pathologists should continue to hold their pessimistic views. Burge[10] found that only 8.6% of mothers delivering congenitally defective infants had threatened to abort, and that only 11% of mothers having *severely* defective infants threatened to abort. Of the threatened abortions in 12,000 cases this author felt that no more than 1.5% ended in major anomalies. Therefore, of 100 mothers threatening to abort, 98.5 should produce a baby free of major defect. Mall and Meyer long ago pointed out the tremendously high incidence of abnormality in tubal pregnancies, which, of course, further stresses the importance of physical environment (the decidua). And yet Murphy could find no positive connection between the presence of placenta prævia and the incidence of anomaly.

One of the difficulties to be mentioned at this point is that many abortuses classified as anomalies by the first investigators in this field showed defects in only a part of the decidua, and it is conceivable that this defect might not have prevented the birth of a normal infant had pregnancy continued. Thus Hertig and Rock concede that of 12 "abnormal" fertilized ova recovered among their 28 early ova, two had only anomalies of implantation and one of those was slight. Four of the seven embryos, which

were very definitely anomalies, might have attained clinical recognition as pregnancies, they believed.

Schull *et al.*[11] from a study of 34 early human ova (24 normal and 10 abnormal) taken from 107 fertile patients with optimal conditions for conception conclude that the probable maximum fertility rate during pre-implantation is 80 to 90%, when there is the greatest ovular loss also; the maximum fertility rate at implantation is 58%; the maximum rate after the 12th day of development is 42%; the ovular loss after the first missed period may be as high as 29%, with or without clinical signs. Defective human ova are due to intrinsic, not environmental defects, they believe.

Should Abortion be Prevented?

What is the evidence for the claim that if abortion can be prevented the attempt to do so should be made?

Despite the generally pessimistic views quoted above, most obstetricians for years have been using progesterone or stilbœstrol or vitamin E in the hope of preventing abortion. Their optimistic experience has suggested very strongly that many of these conceptions can be retained *in utero* and delivered as normal infants later. Such results give the lie to the gloomy prognostics of the morbid anatomists. Burge, as was mentioned before, pointed out that of the threatened abortions in 12,000 pregnancies no more than 1.5% ended in major anomalies. The writer once analyzed most of the series of treated threatened abortions reported in the literature, and came up with comforting figures. The literature continues to abound in studies indicating the good results of one or another form of treatment. Surely such data indicate that when an abortion threatens but does not materialize, either because of treatment or because of spontaneous improvement, the incidence of major anomaly at birth is found to be so low that it justifies attempts at salvage. These studies also leave one with the impression that the pathologists and embryologists have either been too pessimistic because of an improperly weighted cross-section of material, or have laid too much stress on pathological features (particularly of the decidua) which may not alter the course of pregnancy materially. And, indeed, perhaps an initially wounded decidua or fetus may heal without serious malformation ensuing.

Either these clinical workers have all been misled, or the anti-abortive agents they have employed were efficacious in some degree. It is true that the results might be more convincing had they been regularly accompanied by results of hormonal assay, such as urine pregnandiol, or of cervix studies, or an estimation of chorionic gonadotrophin, or a description of vaginal smears. But few or none in this series had such assay results to report. In any case, a urine assay is purely a research requirement that very few practising obstetricians can now or ever will be able to secure and its practical value is limited proportionately.

One glance at such reports as have been cited above, whose numbers could be greatly increased, suggests that spontaneous abortion should be prevented if possible, and that it can be hindered in a definite, but as yet uncertain, proportion of cases.

What has Alpha-Tocopherol to Offer in Prevention?

Vitamin E has been used by a good many people for the prevention of habitual abortion since the publication of Vogt-Moller in 1931. However, relatively few reports of its use in threatened abortion have appeared. We have tabulated below the data on the vitamin E form of treatment of threatened abortion (as distinct from habitual abortion) that have been published to date (Table I).

The writer has long used alpha-tocopherol in such cases and early reported his belief that this agent preserved pregnancy in many cases of threatened abortion, threatened miscarriage and threatened prematurity. At the same time he was sceptical of its value in habitual abortion, believing it to be really effective only if given to the sire before conception occurred. Apparently this was the first time that anyone had suggested this approach, and perhaps the first time that the idea of anteconceptional treatment for this condition had been advanced.

In the past 20 years obstetrical interest in alpha-tocopherol has fallen away sharply. Perhaps this was initially due to loss of faith in the parallel hormone, progesterone, as it became apparent that the small doses of the latter that had long been held efficacious were too small to be really helpful. It was also due to the powerful resurgence, with Boston backing, of the view that threatened abortions usually represent inevitable fetal loss, that only a small fraction, about 20%, was susceptible of salvage, and that there was great difficulty in recognizing which embryos could or should be saved. But, I believe the change was mostly due to the advent of œstrogenic therapy for this condition, an agent sponsored enthusiastically by Karnaky and the Smiths. Now that confidence in the œstrogenic management of abortion is at a low ebb, the time has come to re-evaluate such a helpful alternative therapeutic measure as alpha-tocopherol.

The writer has had what must be a rare experience in this field. For 25 years he has administered vitamin E routinely to each registered private obstetrical patient from the beginning to the end of the pregnancy. There must be few comparable series of consecutive, personally observed private patients, spanning the period from the use of ether-extracted wheat germ oil to the cold-pressed oil product, to the synthetic DL-alpha-tocopherol acetate form, then to the natural mixed tocopherols

TABLE I.

Author	*Country*	*Source of vitamin E*	*No. of trials*	*Success*	*Per cent success*	*Anomalies*
Watson[12]	Canada	Wheat germ oil	15	11	73	0
Currie[13]	England	Wheat germ oil	40	36	90	0
Shute[14]	Canada	Wheat germ oil	60	40	68	5
Macdonald[15]	England	Wheat germ oil	15	9	60	0
Collins, Weed and Collins[16]*	U.S.A.	Wheat germ oil	17	14	92	0
Lubin and Waltman[17]	U.S.A.	Synthetic alpha-tocopherol	15	13	87	0
Fecht[18]	Germany	?	36	16	44	0
Bach and Winkler[20]	Germany	Synthetic alpha-tocopherol	10	9	90	0
Shute[21]	Canada	Wheat germ oil or synthetic alpha-tocopherol	209	155	74	10
Silbernagel[22]	U.S.A.	Wheat germ oil or synthetic or natural alpha-tocopherol concentrates	316	272	86	0?
Silbernagel and Patterson	U.S.A.	Wheat germ oil only	83	53	64	6
Mirsagatova[24]	Russia	Wheat germ oil	500+	?	80	None mentioned
Derankova[19]	Russia	Synthetic alpha-tocopherol	59	48	81	0
Shute (this report)	Canada	Wheat germ oil or synthetic alpha-tocopherol or natural concentrates of alpha-tocopherol	232	195	84	13

*N.B.—This report is confused by the concurrent use of antruitin-S, corpus luteum and thyroid extract in nearly every case. However, the doses of these latter agents used in each case were so small by current standards that they were probably not helpful and may be considered insignificant.

assayed in terms of DL-alpha-tocopherol acetate and highly concentrated, finally to the succinate ester of the natural D-alpha form. A variety of dosages have been used and, of course, many complications have been encountered.

The rationale for the use of alpha-tocopherol may be its anti-œstrogenic property, or the fact that it promotes better capillary circulation in the placenta, or because it facilitates better oxygen utilization by both decidua and fetus.

We have administered alpha-tocopherol to every patient with threatened abortion or miscarriage in this series—except two (three pregnancies) who received œstrogen—and have done this unless the patient was "gushing" blood. Indeed, we have seen two pregnancies preserved (?) thus, after bleeding through a mattress and making a puddle on the floor beneath, and have been slower to admit defeat since then. Patients are always put to bed until bleeding has ceased for four days. The doses used have ranged from two drams of wheat germ oil 25 years ago to 50-450 i.u. of alpha-tocopherol per day at present. The dosage level has been rising steadily as our experience has increased and more potent preparations have appeared, the larger dose being given in what are obviously acute emergencies.

In 4141 private, consecutive, unselected pregnancy cases, all given alpha-tocopherol, there have been 134 recognized abortions and miscarriages, an incidence of 3.2%. Let us add 2% for an outside estimated figure of abortions reported over the telephone before there has been time to report at the office, or before pregnancy has been anything but "going a few days over", and for incidents casually mentioned in conversation at some later office visit. The resultant figure is still only 5%, about half that reported in the literature generally for patients of this type. Surely this lends support to the idea that alpha-tocopherol is helpful in preventing abortion and miscarriage in a large series of consecutive cases treated both prophylactically and therapeutically over a 25-year period.

In the author's series there were 139 threatened abortions and 93 threatened miscarriages. The salvage was respectively 76% and 96%. The incidence of anomalies was 6% and 4% respectively. Surely these 13 babies, only seven of whom lived, were not too high a price to pay for the lives of 182 normal children.

What truth is there in this idea that congenital anomalies are so numerous in pregnancies that threaten to abort and fail to do so that it is either futile or foolish to attempt to preserve them? The data given above suggest that the delivery of anomalies at or near term is rare in precarious pregnancies salvaged by the administration of alpha-tocopherol.

It would appear that this substance is helpful in the prevention of congenital defect, whether given just before or just after conception, or both, and this observation can be linked with reports in the literature of anomalies occurring in the young of rats and turkeys made vitamin E-deficient.

The fetus is a body with a circulation superimposed on and parasitic on a larger body and circulation. The placenta is its foundation. Presumably, if there is a good foundation a good infant will develop and the mother remain normal. On the other hand, a defective placenta may alter the whole pregnancy and its product for the worse.

This placenta supplies the embryo with nutrients of all types, but especially oxygen. Here alpha-tocopherol probably plays a vital role. Recent studies stress the unique values of alpha-tocopherol as an oxygen-conserving agent, as previously mentioned. If any one argument would justify its general use in pregnancy this would be it.

Eastman[25] has made this need abundantly clear.

But the placenta can also be regarded as a great sponge, a net of interdigitating capillaries. Their integrity is vital to the life of the fetus. Also, alpha-tocopherol has unique properties, both in preserving normal capillary permeability and in causing capillary dilatation. Here, then, is another major reason for the use of alpha-tocopherol during pregnancy.

We believe, therefore, that every woman should be given alpha-tocopherol from the time of recognition of pregnancy until term—unless the contraindication of pre-eclampsia supervenes at the last.

SUMMARY

Spontaneous abortion may be anticipated in a large number of pregnant patients who have low outputs of chorionic gonadotrophin or pregnandiol, or defective cervical mucus patterns or vaginal smears. The incidence of spontaneous abortion is about 10% of all recognized pregnancies; threatened abortions probably occur in about 15% of pregnancies. About 50 to 60% of threatened abortions go on to abort. Such figures are admittedly very crude. There is gross discrepancy between (a) the pessimistic figures of the pathologists who study aborted material and believe that more than half of threatened abortions are so defective as to make miscarriage inevitable, and (b) the findings of obstetricians who try to prevent threatened abortion and report about 80% success in doing so.

If threatened abortions go on to term or near it, about 4 to 5% of infants eventually delivered have anomalies. Alpha-tocopherol is as effective as any reported therapeutic agent in the management of threatened abortions, the figures in the literature suggesting about 80% salvage. In 4141 private pregnancy cases given vitamin E as soon as pregnancy was recognized, the writer has had an incidence of abortion and miscarriage of 3%. Perhaps the actual corrected figure for abortion in this practice has been about 5%, which is about half the usual figure quoted by investigators in this field. Of 139 threatened abortions 76% were salvaged with alpha-tocopherol; 93 threatened miscarriages, 96%. The congenital anomalies born were 6% and 4% respectively. For the whole series the rate was 84% salvage and 6% anomalies. Thus 182 normal children were salvaged at a cost of seven defective children who lived. The rationale of alpha-tocopherol therapy is briefly discussed.

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RÉSUMÉ

On peut s'attendre à un bon nombre d'avortements spontanés chez les femmes enceintes dont le taux de gonadotrope chorionique ou de prégnandiol est bas ou dont les frottis vaginaux ou l'étalement des glaires sont anormaux. La fréquence de l'avortement spontané s'élève à environ 10% de toutes les grossesses et la menace d'avortement, probablement à 15%. Environ 50 à 60% des menaces d'avortement se concrétisent. Ces données sont évidemment exprimées en chiffres ronds. Il existe un désaccord important entre l'attitude pessimiste de l'anatomo-pathologiste qui à l'examen de l'œuf croit que dans plus de la moitié des menaces d'avortement le fœtus est si défectueux que la fausse couche est inévitable, et les rapports des obstétriciens qui cherchent à prévenir la menace d'avortement et prétendent réussir dans 80% des cas. Quand une menace d'avortement est enrayée le produit de la conception est anormal dans 4 à 5% des naissances. L'α-tocophérol est aussi efficace que n'importe quel autre agent thérapeutique dans la conduite du traitement de la menace d'avortement. Les chiffres glanés dans la littérature médicale montrent une récupération dans environ 80% des cas. L'auteur a administré de la vitamine E à 4141 femmes enceintes traitées sous ses soins et a noté une fréquence d'avortements ou de fausses couches de l'ordre de 3%. Le taux corrigé des avortements dans sa clientèle en général serait environ 5%, ce qui représente à peu près la moitié des chiffres habituellement cités par les chercheurs dans ce domaine. Il a réussi à récupérer 76% des 139 cas menacés d'avortement grâce à l'administration d'α-tocophérol. De même, 96% de 93 cas de fausses couches imminentes ont pu être évités. Les anomalies congénitales observées chez les enfants nés de ces grossesses se sont élevées respectivement à 6 et à 4%. Dans la série entière le taux de récupération a été de 84% et celui des anomalies de 6%. Il y a donc eu 182 enfants normaux épargnés au coût de 7 enfants anormaux qui ont survécu.

METASTATIC CARCINOMA OF THE LIVER

The determination of the rate of urinary bilirubin excretion in patients with increased serum alkaline phosphatase and normal serum bilirubin levels offers a more specific means of predicting the presence of metastatic carcinoma in the liver than do the latter two findings alone. Sixty-nine per cent of patients with a urine bilirubin excretion rate greater than 0.25 mg. per 2 hours, a serum alkaline phosphatase above 6.0 Bodansky units, and a normal serum bilirubin level were found at autopsy or operation to have hepatic metastases of carcinoma. The determination of the rate of urinary bilirubin excretion may also be of value in recognizing liver metastases in patients who have carcinoma metastasizing to bone.—E. J. Fitzsimons, H. M. Sommers and T. C. Laipply, *J. Lab. & Clin. Med.*, 54: 192, 1959.

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STREPTOCOCCAL INFECTION WITH PROLONGED DEBILITY IN CHILDREN
VALUE OF THE ANTISTREPTOLYSIN O TITRE

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THE antistreptolysin O (ASO) titre is a valuable aid in the diagnosis of acute rheumatic fever and in the evaluation of illnesses manifesting joint pains.[1, 2] It is also of value in following the course of hæmolytic streptococcal infections.[3-7] These infections are common in clinical practice and are often followed by a period of prolonged debility, the etiology of which remains obscure until the ASO titre is estimated and found to be high.

This paper stresses the frequency of this syndrome, one which has not been emphasized in the literature. It also stresses the value of the ASO titre in this type of case and contrasts it with titres found in 100 children with miscellaneous disorders.

In an attempt to assess the titre range in the Saskatoon area, a group of 164 children in whom ASO titres had been estimated was studied. Sixty-five of the children (Table I) had ASO titres of 250 Todd units or more; 16 had had a recent sore throat or otitis; nine had had acute rheumatic fever; six, acute nephritis; six, acute cervical adenitis; and two, probable rheumatoid arthritis. Twenty-five were described as unwell without any of the major manifestations of rheumatic fever being present. Only one had an unexplained titre over 250 Todd units.

One hundred children (Table II) had miscellaneous disorders not related to streptococcal infection. All except one had ASO titres below 250 Todd units. The ages in each group varied from 2 to 14 years, the largest number being between 7 and 12 years of age.

It can be concluded, therefore, that in this area at the present time a titre of 250 Todd units or higher is rarely found in children who have not had a recent streptococcal infection. A titre of this level would indicate that the child's history should be reviewed and that the child should be examined carefully; that a sedimentation rate and other tests be performed. In the vast majority of cases, an explanation for the elevated titre and often indications of an unresolved disease will be found.

TABLE I.—SIXTY-FIVE CHILDREN WITH ASO TITRE OF 250 TODD UNITS OR OVER

Todd units	*Streptococcal infection (elevated sed. rate, history of recent sore throat or "flu", general debility)*	*Acute rheumatic fever*	*Acute cervical adenitis*	*Recent sore throat or otitis*	*Acute nephritis*	*Other disorders*	*Unexplained*
250	3		4	8			
333	2		1	4		2 (rheum. arthritis)	1
500	4	2	1		1		
625	3	1		3	3		
833	6	2		1	1		
1250	6	3			1		
2500	1	1					
Total	25	9	6	16	6	2	1 (included in Table II)

Significance of the ASO Titre

Normal ASO titres.—Hollinger's study[8] of normal children of similar age groups revealed that titres of 250 Todd units or more were found in 10% of children from Tijuana, 15% from San Francisco, 20% from Bakersfield, and 35% from Mexico City.

The level of this titre depends not only upon the intensity of the immunizing stimulus but also on the host's response to this stimulus and the extent of his previous exposures to the same antigen. Generally, ASO titres below 250 Todd units have not been considered significant unless serial tests show a definite rise. It must be appreciated that strictly speaking there is no "normal" value for these antibodies.[2] Probably 10 to 20% of children with streptococcal infections do not have a significant rise in titre.[2]

An elevated titre indicates that the child has had a recent streptococcal infection and that care should be taken to make sure he has not developed cardiac, renal or other complications. In my experience, these sequelæ, although still common, are not nearly as frequent as a period of prolonged uncomplicated debility.

Elevated ASO Titre and Prolonged Debility.

During the past two and a half years I have had 15 children directly under my care and have had

TABLE II.—ASO TITRE IN 100 CHILDREN WITH MISCELLANEOUS DISORDERS

Todd units	*No. and %*	*Cumulative %*
0	26	26
12	15	41
50	15	56
100(125)	32	88
166	11	99
250	0	99
333	1	100
Over 333	0	
Total	100	

access to 10 additional ones who have had a period of prolonged debility associated with an elevated ASO titre. The following description is typical.

The child, 3 to 10 years of age, is brought to the physician because of general debility which has lingered from several weeks to several months. The parents usually say that the child had "flu" initially—diagnosed by themselves most frequently—and has not been well since.

Your notes record that he had recurrent mild to moderate fever and symptoms of an upper respiratory infection and occasional sore throats; headaches were frequent and diffuse aches and pains common; arthralgias were rare and joint involvement was absent. The child became constantly tired and listless when previously he had been active and vigorous.

On examination, the child is languid and pallid. The temperature is frequently normal, but may be elevated. The heart is clinically normal, but at times a very soft systolic murmur is heard; often the case in normal children. This murmur may cause concern to the physician in assessing its significance and he may label the disease rheumatic fever, although uncertain of his diagnosis. The electrocardiogram is within normal limits. The sedimentation rate is almost invariably elevated from 40 to 100 mm. per hour by the Westergren method. In many small, apprehensive children, the Westergren or other methods requiring veni-puncture may not be practicable. In these cases a micro method has proved simpler and is reliable,[9] with values from 20 to 50 mm. in one hour. This micro method should be used without hesitation in small children, especially in your office practice, or else in many cases no sedimentation rate will be obtained at all.

If the sedimentation rate is elevated the ASO titre should also be estimated. (This may be done at a hospital laboratory or, in Saskatchewan, at the Provincial Laboratory.) It is a relatively simple and inexpensive test. In my experience this has frequently been elevated (250 Todd units to 2500 Todd units).

ILLUSTRATIVE CASE REPORTS

The following are six brief summaries.

CASE 1.—M.K., a six-year-old girl, suffered from anorexia, weakness, loss of weight, frequent colds and slight sore throats for two months. Examination was essentially negative. Sedimentation rate (ESR) was 46 mm. per hour (Westergren). ASO titre was 625 Todd units. The throat culture grew a streptococcus, pyogenic group (beta). The white blood cell (WBC) count was 10,050, made up of 39% neutrophils, 7% young neutrophils, 44% lymphocytes, 3% monocytes and 7% eosinophils. The patient was treated with penicillin and bed rest, and rapid recovery ensued with no cardiac complications.

CASE 2.—F.B., an 11-year-old girl, was unwell for almost three weeks. Her illness began with a head cold and cough which lasted a week. She developed a sore throat and fever in the previous two days, but was continuously tired and weak. Physical examination revealed a temperature of 101° F. but was otherwise negative. The sedimentation rate was 76 mm./hour; ASO titre 833 Todd units; C-reactive protein, negative. The hæmoglobin value was 87%, and the white blood cell (WBC) count was 7400 per c.mm. with 49% neutrophils, 4% young neutrophils, 40% lymphocytes, 4% monocytes, 2% eosinophils and 1% basophils. The chest radiograph was negative, and the electrocardiogram (ECG) was normal. A normal flora was reported on throat culture. She remained in hospital 10 days; was treated with bed rest for three weeks, and penicillin intramuscularly for the first week and then orally for ten days. The sedimentation rate (ESR) remained elevated for a further two weeks after discharge. Rapid clinical improvement resulted, with no evidence of carditis.

CASE 3.—M.H., a three-year-old girl, had a recurrent fever for four weeks in the form of three episodes lasting five to seven days each and occurring at weekly intervals with associated occasional emesis and headache. Sore legs and sore throat were often present then. The child was pallid and looked unwell, with a temperature of 100.8° F. Several firm, discrete, slightly tender nodes were found in the anterior and posterior triangles of the neck. ESR was 106 mm./hour (Westergren); C-reactive protein, 2+; ASO titre, 500 Todd units; WBC, 4850; neutrophils 47%, young neutrophils 6%, lymphocytes 41% and monocytes 6%. She was treated with injectable penicillin for one week, then oral penicillin for three weeks; she remained in hospital five days, followed by modified bed rest for one month. This child had a mild recurrence about a year later, and the ESR was 45 mm./hour. General debility was present for a few weeks, with a slight sore throat. The ASO titre previously down to 250 was up to 500 units again. She responded to similar treatment. No murmurs were heard and the ECG was normal.

CASE 4.—T.W., a four-year-old boy, had been listless and anorexic for three weeks beginning 10 days after the onset of earache, sore throat and swollen cervical glands. He was treated with penicillin and sulfonamide for three days. The headache, dizzy spells and listlessness continued and the temperature became elevated at times. He remained in hospital five days. At this time physical examination was negative. The hæmoglobin was 11.7 g. % and the WBC 8600 with a normal differential. ESR was 58 mm./hour; ASO titre, 500 Todd units; chest radiograph, negative; ECG, negative. Unfortunately, no throat cultures were taken in Cases 3 and 4. He was treated with oral penicillin and bed rest for two weeks. A recurrence almost a year later with an ESR of 87 mm./hour and ASO titre of 250 Todd units responded to similar treatment.

CASE 5.—V.F., a seven-year-old girl, experienced recurring episodes of headaches and high fever for two months, coming on every few days for a day or two at a time. She had a sore throat a few times, and was in hospital for a day with the diagnosis of possible appendicitis because of complaints of abdominal pain. Examination revealed an unwell, languid child. The WBC count was 16,750; ESR, 88 mm./hour; throat culture showed normal flora; C-reactive protein, 4+; ASO titre, 1250 Todd units; ECG (on two occasions),

normal. She was treated with bed rest for almost a month before sedimentation rate became normal and was in hospital for 16 days. Penicillin was given intramuscularly, and later orally at reduced dosage for over a month. In this child the possibility of acute rheumatic fever was seriously entertained, and a completely satisfactory diagnosis could not be made. A year later a Grade I systolic murmur was heard at the apex and left sternal border, and is present two years later. She had a recurrence one year later and also at two years consisting of fever, general debility and sore throat lasting for almost a week. The ASO titre, previously down to 250, rose to 500 Todd units on each of these occasions. She was treated similarly, and no change in the character of the murmur was noted. Each time she responded within several weeks. The question of penicillin prophylaxis has not been answered.

CASE 6.—D.B., a six-year-old girl, had an onset two weeks previously of headache, slight vomiting, loss of appetite and fever. It was thought at this time that she had influenza. However, general malaise continued and the child did not recover her usual brightness. On admission, the temperature was found to be normal; the child looked a little pale and generally unwell, but no abnormality could be found on examination. The radiograph of the chest was negative. The ASO titre was 2500 Todd units; hæmoglobin 15 g.; WBC 9100 with a normal differential; ESR 66 mm. in one hour; C-reactive protein negative. A throat culture contained no pathogenic forms. Another sedimentation rate determination one week later was 42 mm. in one hour. The electrocardiogram was normal. This child was treated with bed rest and oral penicillin, and was considered to be suffering from a hæmolytic streptococcal infection with debility.

Most of the other cases followed a similar pattern and had elevated sedimentation rates and ASO titres, with negative findings on ECG and chest radiograph and no evidence of cardiac involvement.

In a few cases, the ASO titre was at first only between 12 and 100 units, but in a week or so definite double titre rises occurred, i.e. to 250 or 333 or higher, verifying the presence of recent hæmolytic streptococcal infection. In doubtful cases the ASO titre was repeated at weekly intervals.

DISCUSSION

The association of hæmolytic streptococcal infection with the etiology of rheumatic fever is generally accepted,[1, 6] and the incidence of this complication after an infection with any type of Group A hæmolytic streptococcus is 3%, according to Ramelkamp,[11] but is considerably greater in those who have had a previous attack of rheumatic fever. Another 3% he states develop an illness characterized by mild symptoms or isolated physical or laboratory findings indicative of the rheumatic process, but in this group the abnormality disappears so rapidly that it is not possible to classify these cases as examples of rheumatic fever. However, some of these patients may later develop valvular heart disease, and in them there will be no history of a preceding attack of acute rheumatic fever. Other authorities[12] feel that in the case of children less than 3% develop rheumatic fever after streptococcal infections. Ramelkamp's figure was based on work done in army camps among young adults.

TABLE III.—STREPTOCOCCAL INFECTION WITH PROLONGED DEBILITY—25 CASES

Ages: 2½ years to 14 years. Average: 7 years
Sex: Female—18
Male — 7
Sedimentation rate: (mm./hr., Westergren) 35 to 106. Average 63.
C-reactive protein: 6 negative, 5 positive (1 to 4 plus).
ASO titre—summarized in Table I.

In the present group of 25 patients with chronic debility after a streptococcal infection, none displayed any of the major signs of rheumatic fever (outlined by Jones[16]). Some out of this group have now been followed up for 2½ years, and although several have had recurrences of a milder nature with elevated sedimentation rates and elevated ASO titres, none have developed any of the major signs of rheumatic fever. During this same period I have treated only two patients diagnosed definitely as rheumatic fever and have seen several others in consultation.

Almost all the patients of our series were unwell following an illness labelled "flu" or sore throat, but without the intervening latent period of a week or two characteristic of acute rheumatic fever. None received adequate penicillin therapy during the initial period of their illness, and in fact most were not seen or treated at that stage. As a result very few throats were swabbed for culture purposes and of those cultured only two grew beta-hæmolytic streptococci. The picture, however, was that of a continuing infection with the likelihood that streptococci were still present in the oropharynx.

It has been recommended that the throat culture be taken routinely in cases of sore throat to avoid unnecessary treatment with penicillin.[5, 14] This routine is ideal but in the average practice is not feasible. On occasions where the culture can be obtained, a delay of 24 to 36 hours before penicillin is given will not interfere with the prevention of rheumatic fever.[10] On clinical grounds alone it is impossible to be certain that a given throat infection is streptococcal in origin, and the prevention of rheumatic fever therefore poses a very difficult problem. In any suspicious case adequate penicillin therapy should be given.

The treatment of these patients with prolonged debility after a streptococcal infection consisted of bed rest (generally less strict than in children with rheumatic fever), followed by a gradual return to normal activities when the sedimentation rate became nearly normal. Hospitalization for a week or longer was considered advisable in most of the cases: this enabled adequate investigation to be undertaken and also made it easier to obtain the cooperation of parents who otherwise might not have viewed the child's illness as serious. Further, it helped accustom the child to restricting his activities.

Oral penicillin was usually prescribed and at least 200,000 units of penicillin G or preferably penicillin V was given four times daily for a minimum period of 10 days, and then at reduced dosage for a week, and prophylactically for a few weeks longer. In some cases intramuscular procaine penicillin was used daily during the first week, or Bicillin, given less frequently. This form of treatment was recommended by the American Heart Association for acute streptococcal infections,[13] but we added the continuing lower dose for a longer period to their plan.

The children generally responded well to the above regimen, developed no complications and improved rapidly. The sedimentation rate, as in rheumatic fever, remained elevated for several weeks or longer, and the children were absent from a great deal of schooling. The nature of the disease was explained to the parents and the relationship to rheumatic fever was discussed. The patients were not placed on indefinite penicillin prophylaxis, although the question of whether to do so arose in a number of cases.

Rantz,[15] in discussing the problem, deplores the growing tendency of physicians to make a clinical diagnosis of rheumatic fever solely on the basis of vague symptoms, high sedimentation rate and high ASO titre. He stresses however the value of a titre of 500 Todd units or more in indicating a recent hæmolytic streptococcal infection.

The children I have reported must be followed up for a much longer period than has been done in this series in order to be certain that insidious valvular disease has not developed and that some of them are not in fact cases of non-arthritic rheumatic fever described by Rantz.[6]

I feel that it is important to relate the cases described to a streptococcal infection. Firstly, it removes them from the group of patients with vague debilities and low-grade infections of undetermined origin; secondly, it leads to more rational therapy; thirdly, the co-operation of the parents is more easily obtainable when a satisfactory explanation of the illness can be given.

Whether the illness should be labelled post-streptococcal infection debility or whether it is a persistent streptococcosis establishable bacteriologically is not clear. Certainly this syndrome should be considered a complication of streptococcal infections along with rheumatic fever and nephritis.

The patients differ from those with rheumatic fever, and one may postulate that their illness is due to a persistent low-grade streptococcal infection rather than to an antigen-antibody reaction such as is believed to occur in acute rheumatic fever.[1, 6] They therefore lack the carditis, valvulitis and polyarthritis which complicate this more serious disease.

SUMMARY

A syndrome has been described consisting of protracted general debility, low-grade fever, occasionally of muscular pains, and an elevated sedimentation rate and ASO titre. This often follows so-called "flu" and a sore throat may be present. There does not appear to be any cardiac involvement. This syndrome is frequently misdiagnosed as rheumatic fever. The diagnosis of rheumatic fever on the evidence of an elevated sedimentation rate and ASO titre alone is not justified. However, in each case, rheumatic fever must be seriously considered.

These cases respond to bed rest and adequate penicillin therapy, given for several weeks or longer. A study was made of the ASO titres of 100 children with miscellaneous disorders. Only one was found to have a titre of 250 Todd units or over. Sixty-four out of 65 children with titres of 250 Todd units or over were found to be suffering from some illness usually associated with an elevated titre or to have had recent sore throats. The finding of an ASO titre of 250 Todd units or more in a patient in the Saskatoon area should impress us with the need to investigate carefully to determine the cause and then eliminate any active disease, e.g. the syndrome described or some other illness associated with a high titre.

I am very grateful to my colleagues who have allowed me access to patients under their care and to Dr. J. W. Gerrard for his criticism and advice.

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RÉSUMÉ

L'auteur décrit un syndrome comprenant de la débilité générale, un fébricule et quelques douleurs musculaires, associés à une élévation du taux de sédimentation et d'antistreptolysine O. Cet état suit souvent une attaque de grippe et peut exister concurremment à une angine; il ne comporte cependant pas d'atteinte cardiaque. Ce syndrome passe souvent pour la maladie de Bouillaud, mais le diagnostic du rhumatisme articulaire aigu ne saurait être basé uniquement sur une sédimentation rapide et une élévation de l'A.S.O. Cependant le R.A.A. occupe une place importante dans le diagnostic différentiel de cet état mal défini. Le meilleur traitement est encore le repos au lit et l'administration de pénicilline pendant quelques semaines ou même davantage. On a déterminé le titre d'A.S.O. chez cent enfants atteints d'affections diverses; un seul dépassait 250 unités Todd. De 65 enfants présentant une élévation de titre au delà de ce niveau 64 souffraient d'une affection quelconque compatible avec cette anomalie sérologique ou avaient souffert d'angine. Dans la région de Saskatoon la découverte d'un titre de 250 unités Todd, ou plus, semble indiquer la présence du syndrome décrit ci-haut ou de quelque autre affection qu'il importe de dépister.

Case Reports

RHEUMATOID ARTHRITIS AND AGAMMAGLOBULINÆMIA

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SINCE BRUTON'S first report in 1952,[1] numerous cases of agammaglobulinæmia have been reported, so that the disease is now a well-known clinical entity. It occurs in two forms, the congenital, which is transmitted as a sex-linked recessive and occurs in male children, and the acquired or adult form, which appears suddenly in later life.

The clinical features are increased susceptibility to bacterial infections, extremely low serum levels of gamma globulin (below 100 mg. %),[2] absence of antibodies from blood and tissue, and lack of response to antigenic stimulation. The congenital form appears as recurrent infections beginning in infancy. These may involve almost any organ or system, but are predominantly respiratory. Repeated infections are often due to the same organism. In the adult form there is a sudden onset of repeated infections after a period of good health. This suggests a relatively rapid fall in the serum gamma globulin level, but direct bio-chemical proof that this occurs has not been obtained.[3] The adult form shows no particular age or sex preference, and tends to be associated with slightly higher levels of serum gamma globulin.

The pathological features are extreme hypoplasia of lymphoid tissue, with absence of plasma cells from the lymph nodes and the tissues involved in chronic infection. The metabolic abnormality seems to be due to a dysfunction of reticuloendothelial tissue, so that antibodies are not produced. Injection of gamma globulin to maintain normal levels in serum still does not permit antibody production.

A particularly puzzling feature is the occurrence of a chronic arthritis, apparently of the rheumatoid type, which has been noted in a relatively high percentage of cases. This is distinct from episodes of acute pyogenic arthritis, with normal evolution, which have also been reported. Janeway initially felt that this was not a true rheumatoid arthritis, but a reaction of the joints to repeated subclinical bacterial insults.[4] More recently he has reported five cases of chronic arthritis and one of dermatomyositis in a group of 12 agammaglobulinæmic patients.[5] He now suggests that these represent "collagen disease", and describes a clinical picture of intermittent, fluctuating hydrarthrosis, involving many joints over several years, with mild pain, mild limitation of motion, and minimal local heat and tenderness.

Synovial biopsy in two cases showed chronic synovitis. His conclusion was that this syndrome may represent rheumatoid arthritis modified by the inability of the patients to form immune globulins, or more likely a chronic form of the "acute toxic synovitis" seen associated with acute infections in children. The applicability of the term "collagen disease" to these cases seems questionable in view of the atypical clinical picture and the absence of collagen deterioration in the pathological material.

Good *et al.* reviewed all the cases of joint disease associated with agammaglobulinæmia published up to 1957.[6] These comprised nine reports, including Janeway's. To these they added three detailed cases of arthritis with agammaglobulinæmia. The first patient, an adult, had intermittent involvement of most of the joints of the body and radiological changes consistent with rheumatoid arthritis. The second patient, also with the acquired type of disease, had involvement of the interphalangeal, metacarpo-phalangeal, intertarsal, and knee joints, and possibly spinal involvement, but no radiological changes. The third patient had the congenital form of the disease with involvement of the knees, elbows, and the fingers of the left hand. The presence or absence of radiological changes was not recorded.

In addition, they mentioned cases of scleroderma and dermatomyositis associated with agammaglobulinæmia, and autopsy studies on a child presumed to have agammaglobulinæmia on apparently valid clinical and pathological grounds, who also had pathological evidence of a generalized collagen disease, possibly lupus erythematosus.

They conclude from these observations that theories of the etiology of rheumatoid arthritis depending on hypersensitivity, or excessive amounts of circulating antibody, are called into serious question. On the other hand they observe that the recent demonstration that agammaglobulinæmic patients can develop bacterial allergy makes it unwise to discard this etiological hypothesis entirely.

Over the past 4½ years I have had the opportunity of observing a child with agammaglobulinæmia and severe bronchiectasis who has developed a chronic arthritis typical of Still's disease or juvenile rheumatoid arthritis, and who has had in addition three attacks of acute pyogenic arthritis. In view of the widely differing opinions regarding the syndrome I feel justified in recording this case.

This boy was first seen in the autumn of 1953 with a history of almost continual respiratory illness since about six months of age. His previous physicians had treated him for approximately 12 attacks of pneumonia, and innumerable attacks of tonsillitis and otitis media in the previous 6½ years. At three he had severe paralytic poliomyelitis, which left a residual paresis of the right leg with foot drop; while he was convalescing from this he had an almost fatal attack of morbilli which required tracheotomy. At four he had a tonsillectomy, and was somewhat better for about one year, and from then had a steady round of respir-

atory infections, mostly with pneumonia. When first seen he presented a typical picture of moderately advanced bronchiectasis. He was a pale, dwarfed, ill-looking child of seven, with finger clubbing, cyanosis of the nail beds, decreased expansion of the right chest, basal dullness and bilateral basal rales, rhonchi, and harsh breath sounds.

Shortly after, he had an episode of acute pyogenic arthritis of the left shoulder, which subsided in about a week on appropriate antibiotic therapy. The joint was not aspirated.

During the remainder of the winter he had rubella and two attacks of bronchopneumonia, the second complicated by an almost fatal attack of acute left ventricular failure. He required maintenance therapy with antibiotics throughout the spring.

During the summer and autumn of 1954 he received a course of injections of an autogenous vaccine made from cultures of his sputum, with apparently a great deal of benefit. His chest became clear for the first time in months, he gained weight, his cough and sputum decreased, and his energy and capacity for activity were much increased.

The sputum contained *Strep. viridans, Staph. aureus hæmolyticus, B. xerosis, Micrococcus catarrhalis,* and an unidentified spore-bearer, and a vaccine was prepared from a mixture of these organisms.

About this time the diagnosis of agammaglobulinæmia was considered, but this possibility was rejected because of the improvement associated with administration of the vaccine. It was felt that a patient unable to form antibodies should not improve from a measure designed to improve antibody production.

He continued relatively well, except for a few minor flareups in his chest, during the winter of 1954. However, he had coarse rhonchi bilaterally most of the time, and occasional rales.

In April 1955, he had an attack of acute pyogenic arthritis of the right hip. Radiographs showed no bony involvement. Treatment with erythromycin and triple sulfonamides resulted in clinical resolution in one week without joint aspiration. Blood cultures before treatment grew *H. influenzæ.*

His parents were finally persuaded to take him to a large pædiatric centre for study, and he was admitted in September 1955, after having a fair summer. Investigations for fibrocystic disease were negative; left bronchograms showed major disease in the lower lobe and lingula, and lesser involvement of the upper lobe. The bacteria involved were *H. influenzæ,* pneumococcus, and *Staph. aureus.* He was discharged, to return for right bronchograms and possible lung resection.

Immediately after this he had another severe attack of bronchopneumonia, and during the remainder of the winter had several episodes of fever, with increased rales, each of which probably represented a mild bronchopneumonic process. He did not return for his right bronchograms. During the early part of 1956, he began to complain of aching pains and stiffness in his arms and legs, and as the months passed he gradually developed the picture of severe Still's disease. By October 1956, he was suffering considerable pain in his hands, wrists, elbows, knees and ankles. He had swelling, moderate tenderness, and severe contractures of both knees, with marked limitation of flexion and extension.

The elbows were moderately stiff, with extension limited to about 150 degrees. There was definite wrist swelling and tenderness, with early ulnar deviation, and moderate spindle deformity, stiffness and tenderness of the fingers of both hands.

Radiographs of wrists, elbows, and knees showed marked soft tissue atrophy and osteoporosis, normal epiphyses and relatively normal joint spacing, with very little evidence of destruction of articular cartilage. These findings were not particularly suggestive of arthritis, but in view of the clinical picture the diagnosis of juvenile rheumatoid arthritis was allowed to stand. It was presumed that the arthritic process was not sufficiently advanced to produce radiologically obvious joint changes.

Salicylate therapy had already proved ineffective, and he was therefore started on phenylbutazone (Butazolidin) plus a program of rest in plaster leg shells and forearm splints, with regulated exercises and home physiotherapy. The initial dose of phenylbutazone was 300 mg. daily, which produced almost immediate relief of pain. The dose was then decreased so that a maintenance dose of one tablet (100 mg.) daily was soon reached. The stiffness and deformities disappeared more gradually, beginning with his fingers, then wrists, elbows and knees in that order. By March 1957, he had relatively normal function in his hands and arms, and his knee extension had improved to about 145 degrees.

In February and March 1957, he had further attacks of bronchopneumonia, followed by a second attack of morbilli, again with severe laryngo-tracheobronchitis.

On April 30, he was seen with an attack of acute pyogenic arthritis of the left knee. Aspiration obtained a large amount of thick yellow pus containing masses of organisms resembling pneumococci on smear. No growth was obtained on culture, possibly because a massive initial dose of oleandomycin had been administered six hours before aspiration could be performed.

After the acute joint condition subsided, traction on both legs was continued in a partially successful effort to correct his knee contractures. He was finally discharged with both legs in plaster casts, and further extension was obtained by wedging.

During this admission serum proteins were analyzed, (Table I) and the gamma globulin level was found to be 80 mg. %, in comparison with normal values of 800 to 1200 mg. %. He was given 10 c.c. of immune serum globulin, and this was continued after discharge every four weeks.

During the gradual attainment of further knee extension, some correction of his foot drop was attempted. This was finally completed inadvertently by accidental fracture of the lower third of the right tibia and fibula with very moderate pressure. This undoubtedly occurred because of extreme osteoporosis. The fracture was reduced, but enough anterior displacement

TABLE I.—RESULTS OF ELECTROPHORESIS

	Normal values g. %	*Patient—W.T.* *May 12, 1957* g. %	*Oct. 21, 1959* g. %
Total protein	6.0 - 8.0	6.7	6.5
Albumin	4.6 - 5.6	4.18	4.71
Globulins:			
alpha 1	0.1 - 0.3	0.21	0.33
alpha 2	0.2 - 0.5	1.39	0.58
beta	0.5 - 0.7	0.83	0.72
gamma	0.6 - 1.1	0.08	0.16

was left to partly correct foot drop, so that he can now stand with a heel lift.

During the past 18 months he has steadily improved. Last winter a persistent hacking cough with occasional rales and fever was not controlled by increasing the gamma globulin dosage, and required repeated courses of antibiotics. During one of these exacerbations he had an episode of acute left ventricular failure. After this, maintenance doses of antibiotics controlled the exacerbations satisfactorily. The antibiotic was changed from time to time as appeared indicated by the clinical response, and was given in a dose of 100 mg. daily. During the summer of 1958 even this small dose proved unnecessary. He also takes 0.125 mg. of Digoxin, and 100 mg. phenylbutazone daily. Several attempts to discontinue the latter have been followed by the appearance of joint pain and stiffness similar to the symptoms at the onset of arthritis.

His present health is the best he has ever had. He is active and energetic, walks easily and well, and has no pain. He has grown about two inches (5 cm.). He has a moderate cough, minimal sputum, a few coarse basal rales and rhonchi, a moderately emphysematous chest, and no evidence of arthritis except for bilateral knee contractures of about 10 degrees. This is a marked contrast to the dyspnœic, often cyanosed, pulmonary invalid, who was so crippled by arthritis that he had not walked in over two years.

DISCUSSION

Provided that the diagnosis can be accepted, this case tends to confirm the contention that collagen disease can occur in the presence of agammaglobulinæmia. If this is the case, the hypersensitivity theory of the etiology of the collagen diseases is open to question.

The reliability of the diagnosis then becomes all-important. The presence of agammaglobulinæmia seems to be satisfactorily established, but the diagnosis of rheumatoid arthritis is less firm, since there is no radiological evidence to confirm it, the sedimentation rate was constantly elevated by the chronic lung infection, and the hæmagglutination test would appear to be valueless in this instance. However, the picture of a chronic arthritis, involving many joints and resulting in characteristic deformities, was sufficiently typical. Moreover the child was seen on many occasions by colleagues, including the orthopædic consultant, all of whom concurred with this diagnosis.

A second interesting feature is the improvement associated with the administration of the autogenous vaccine. It seemed to be too marked and too well maintained to be satisfactorily explained by coincidence. Janeway suggested that "perhaps these patients develop some kind of a resistance other than a specific antibody which protects them . . .".[4] This might be due to stimulation of non-specific antimicrobial tissue factors such as alexin and properdin (or natural antibody) which have bactericidal activity for Gram-negative organisms, or opsonin, and again properdin, which influence phagocytosis.[7] Presumably in this case the vaccine would act as a non-specific stimulus, such as has been observed experimentally with suspensions of various killed bacteria, and with intraperitoneal injections of broth, peptone, and urine.

This observation makes one wonder whether the administration of a vaccine, either autogenous or a commercial stock respiratory vaccine, might not be of some value in conjunction with gamma globulin and antibiotics, which up to now have not provided a complete therapeutic answer.[2] The value of such a measure would be difficult to determine, because it would be used only as an adjuvant to specific therapy, and because the rarity of the disease makes the observation of a significantly large series almost impossible. Since this thought occurred during the preparation of this report, I have started the child on a course of stock respiratory vaccine. I have the impression that it may have accelerated his improvement in the past several months.

Two other points of interest regarding this patient might be mentioned. One is the occurrence of a severe second attack of morbilli. Repeated viral infections have not been commonly observed with this disease. The second is the episode of acute pyogenic arthritis due to *H. influenzæ*. Although it is mentioned as one of the more unusual causative organisms in Holt's *Textbook of Pediatrics*, it seemed sufficiently rare for a search of the literature of the past 15 years to be made. During this time, as far as could be determined, no cases of acute pyogenic arthritis due to this organism were reported.

SUMMARY

A case of juvenile rheumatoid arthritis associated with agammaglobulinæmia, chronic bronchiectasis, and recurrent episodes of acute pyogenic arthritis is reported. The literature on the subject is reviewed. The significance of the observations is discussed with reference to the hypersensitivity theory of collagen diseases, and to non-specific tissue defences against infection. It is suggested that the administration of respiratory vaccines might be of some value as an adjunct to therapy.

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ADDENDUM

Since the preparation of this report the patient's condition has deteriorated considerably in the past two months. This deterioration was heralded by one of two mild respiratory infections with exacerbation of his chronic cough, and finally on October 1 by an acute right bronchopneumonia, which resolved slowly over about three weeks. However the progressive damage of his bronchiectasis, pulmonary fibrosis, and emphysema have decreased his pulmonary reserve so much that he can no longer compensate during such episodes, and he immediately develops cyanosis and acute dyspnœa. Indeed since his recovery from this episode such a mild embarrassment as a slight coughing attack with a mucous plug, followed by minimal bronchospasm, produces acute respiratory distress and cyanosis. He is still receiving gamma globulin, now 10 c.c. at fortnightly rather than monthly intervals; antibiotics as

dictated by the clinical response or culture when available; bronchodilators, potassium iodide, and Digoxin; and daily postural drainage. It is realized that the monthly dose of gamma globulin and probably the fortnightly dose are not sufficient to approach even a normal serum gamma globulin level. However, up to now it has been clinically effective, and considering the financial burden it was felt that the minimal effective dose should be employed. The second electrophoretic tracing (Table I) was taken during his current hospital admission fifteen days after a 10 c.c. dose of gamma globulin.

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UNILATERAL DOUBLE TESTICLES OR TRANSVERSE ECTOPIA OF THE TESTIS*

A. F. BROWNE, M.D. and
NOBLE BLACK, M.D., *Toronto*

ANOMALIES in the development of the male genitalia are not uncommon. Erratic development of the testicle, although not rare, is of particular interest to the surgeon faced with the problem of correction of the unfortunate abnormality. The commonest example of erratic development is the more or less incomplete descent of the testicle along the normal route of descent, the condition known as cryptorchidism.

The case reported here is evidently one of extreme rarity. In our review of surgical literature, we have been able to discover only 25 reported cases of this particular type of transverse ectopia. The earliest report was by Lenhossek in 1886, and since then case reports have appeared at infrequent intervals, the last one by Capt. Joseph E. Davis of the United States Army in 1947. In ectopia of the testicle, in contradistinction to cryptorchidism, the misplaced testicle does not descend along the usual route but as it migrates downward is displaced into an entirely abnormal position. Usually the migrating testicle remains on its own side of the body but in unusual positions—in the superficial tissue of the inguinal region above the external ring, in the area at the base of the penis, in the upper part of the thigh or the femoral region, in the perineal region or indeed in the pelvic cavity itself.

The case we now present falls into the group which has been labelled *transverse ectopia*. Here the right and left testicles, which in the three-month-old embryo were only a few millimetres apart, descend together on one side and are found in more or less close proximity in one side of the scrotum. In our case both were found on the right side; the left side of the scrotum was clinically entirely empty and there was no clinical evidence of an undescended left testicle.

This patient, aged 34, came to Shouldice Surgery asking for repair of a right recurring inguinal hernia. A hernia repair had been carried out elsewhere 15 years previously and had apparently been satisfactory until a few weeks before his visit to us, when the evidence of hernia had appeared again. At no time in our patient's life or at the time of the former operation had any abnormality been noted in his scrotum. In fact, our examiner noted the testicles as normal. The patient is employed as a records clerk and is a healthy, well-developed man, married, with three children.

The following are the surgeon's operative notes as related to this unusual condition. "A redundant tunica vaginalis was discovered which extended for some distance proximally along the cord and, during the separation of this tunica, it was found that this patient had two testicles on the same side. Both testicles were delivered into the inguinal wound and it was found on following the blood supply proximally that there were two distinct spermatic cords, each with its own vas and its own blood supply. Both spermatic cords were followed to the right internal inguinal ring where they disappeared. When isolating the indirect inguinal hernial sac at the internal ring, it was found to emerge between the two cords and to wrap itself around these spermatic cords. This peculiarity in the anatomy was likely responsible for the failure of the operating surgeon 15 years ago to find the original indirect hernial sac. Both testicles were scrotal in position although one seemed a little higher than the other. Although each testicle had a spermatic cord, there was one common tunica vaginalis, a single serosal sac enclosing the two testicles. At the time of operation the scrotum was checked and no evidence of a testicle could be found on the opposite side of the scrotum proper, although the cord leading to one testicle was definitely longer than the other cord, evidently owing to the fact that that testicle was occupying a position toward the left side of the scrotum and therefore required a longer cord."

Preoperatively and postoperatively, the position of the testicles in the scrotum appeared to be normal, suggesting that the septum if one existed had been pushed well over to the left side. External examination of the scrotum postoperatively revealed no median raphe, and no external inguinal ring or cord could be palpated on the left side.

In none of the previously reported cases of this type of abnormality were the two testicles equally normal in appearance. The only variation from normal in our case was a more prominent epididymis which, as shown in Fig. 1, appeared rather like a crown over the testicle, wrapping itself around the latter. Otherwise both testicles appeared to be normal.

With the kind co-operation of Dr. A. C. Singleton of the Department of Diagnostic Radiology, Toronto General Hospital, excretion urography was carried

*From the Shouldice Surgery, Toronto.

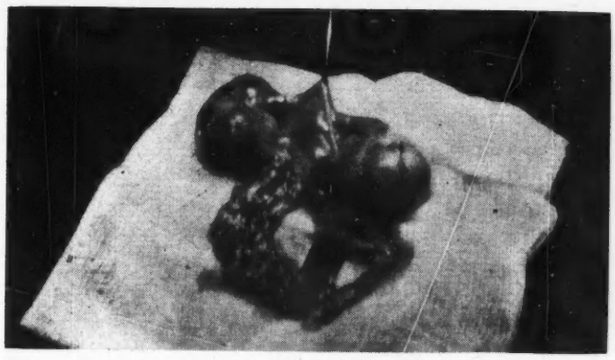

Fig. 1.

out and, except for a small opaque calculus in one of the minor calices at the lower pole of the left kidney, no other abnormality was seen. Kidney and ureter were plainly visualized on both sides of the body.

In many of the previously reported examples of transverse ectopia, one of the testicles has been quite abnormal and in one reported case the ectopic testicle was the site of a malignant tumour.

It is true that we have not proven by histological examination that both testicles in our patient were normal histologically and functionally. The accompanying photograph would however establish with reasonable surety that both testicles were normal, so that this case is one of genuine rarity.

SUMMARY

A very rare example of abnormal descent of the testicle, with transverse ectopia, is presented. In this case both testicles appeared to be normal, in contrast to other reported cases where one testicle was abnormal, very poorly developed or showed malignant changes.

We are grateful to Dr. T. R. Leeson, Department of Anatomy, University of Toronto, for his advice on the anatomy and embryology of the condition.

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HYPERNATRÆMIA IN A PREMATURE INFANT ASSOCIATED WITH FEEDING OF A "CONCENTRATED FORMULA"

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HYPERNATRÆMIA or hypernatræmic dehydration is a clinical syndrome in which the concentrations of serum sodium and serum chloride are markedly elevated. Although the patient's hydration may appear deceptively normal, the presence of marked and rapid weight loss testifies to the actual state of dehydration. Extreme thirst is a prominent feature in the earlier stages, but as the patient becomes more ill this is often replaced by nausea and vomiting. Fever is common. Untreated, the main complication is involvement of the central nervous system with lethargy, hyperirritability, tremors, exaggerated deep tendon reflexes, generalized rigidity with opisthotonos and occasionally convulsions. The cerebral spinal fluid frequently shows an increase in protein concentration. Intracranial bleeding may occur. Many of the signs and symptoms are felt to be due to intracellular dehydration secondary to the increased concentration of electrolytes in the extracellular fluid.

Much has been written on the occurrence of this syndrome in different conditions such as infantile diarrhœa,[1-5, 8, 10-12] brain tumour or injury,[1, 4, 13, 14] pulmonary infection,[1, 4] water deprivation,[4, 6] heat prostration with profuse sweating,[15] hyperventilation with loss of water through the lungs, diabetes insipidus when water is restricted and any condition such as mental retardation, nausea, or vomiting which interferes with oral intake of water.

More recently it has become apparent that the excessive administration of electrolytes and/or protein to sick or premature infants, without supplying sufficient water to enable the sick or immature kidneys to secrete the excess, may result in the same syndrome.[7]

The natural tendency to "strengthen" a formula when a baby is not thriving may result in this hypernatræmic state.

The purpose of this paper is to present a case of hypernatræmia in a premature infant caused by the feeding of such a formula high in solute.

E.J., an eight-week-old female, was born after 28 weeks' gestation and weighed 2 lb. 6 oz. From the third to the 16th day of life she received a formula of two-thirds breast milk and one-third 2% powered milk, which was gradually increased in amount. On the 16th day she was given a formula of 2% powdered milk diluted in the recommended ratio of one tablespoonful to two ounces of water. Additional carbohydrate was not added. With this she increased her weight from 2 lb. 9 oz. to 4 lb. 14 oz. by the 48th day of life. At this time, the formula was "strengthened" to one tablespoonful of 2% powdered milk to one ounce of water.

Eight days later she suddenly developed a low-grade fever without any abnormal physical findings. On urine examination a trace of albumin and many white blood cells and granular casts were found. A non-protein nitrogen determination, therefore, was done and found to be 140 mg. %. She was transferred to the Hospital for Sick Children for further investigation.

Physical examination revealed a fairly active and quite well-developed infant who weighed 5 lb. 8 oz. There was slight pitting œdema of the feet and ankles, puffy eyelids and a doughy quality to the skin. The blood pressure was 85/60 mm. Hg. The remainder of the examination was negative.

The hæmoglobin was 8.5 g. %; white blood cell count 14,500/c.mm. with a normal smear and differential. The pH of the urine was five, with a trace of albumin and 20 white blood cells per high-power field and an occasional granular cast. Urine culture was negative. The serum sodium determination was 179 mEq./litre,

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serum chloride 147 mEq./l., serum potassium 5.5 mEq./l., and the blood urea nitrogen 62.5 mg. %.

It was felt that this baby probably had an underlying renal disease. She was given a 15% sugar solution orally and the following day her serum sodium was 158 mEq./l., serum chlorides 133 mEq./l., serum potassium 4.9 mEq./l. Two days after admission there was further improvement with a serum sodium of 140 mEq./l., serum chloride 120 mEq./l., serum potassium 2.5 mEq./l., serum calcium 9.1 mg. %, serum phosphorus 5 mg. %, total serum proteins 5.1 g. % with an albumin of 3.5 g. % and a globulin of 1.6 g. %. On the fourth hospital day the blood urea nitrogen had fallen to 5.2 mg. %, and on the fifth hospital day the serum electrolytes were essentially normal with a sodium of 136 mEq./l., chloride 109 mEq./l. and potassium 3.9 mEq./l. A cystogram and intravenous pyelogram at this time were found to be normal.

Clinically the patient was improved considerably and after admission to the hospital there was no further fever and no vomiting or diarrhœa. She was discharged from hospital nine days after admission weighing 6 lb. 3 oz. Unfortunately, carbon dioxide combining power was not determined, but in many reported cases this had been extremely low, reflecting a severe state of acidosis.

From the clinical course it was decided that this baby had been unable to handle the high solute load imposed upon its immature kidneys by the concentrated feedings.

DISCUSSION

The load of solute requiring excretion by the kidneys is derived almost entirely from the proteins and electrolytes in the diet. Carbohydrate does not in any way contribute to this load. In infants the obligatory water loss through the skin is proportionately greater than in the older child or adult because of the relatively greater body surface area. This results in less water being available to enable the kidney to excrete the necessary solutes.

Pratt and Snyderman[7] have shown that premature infants fed a formula high in solute are prone to develop hypernatræmia. Equicaloric feedings were prepared in such a manner that one contained evaporated milk, water and carbohydrate and the other simply evaporated milk and water. The latter unmodified formula resulted in an intake of about 40% more protein and minerals than the former and presented the kidney with 85% more solute load when fed to the infants. Under ordinary circumstances the kidneys of a full-term normal infant could probably handle this extra load unless compromised by excessive water loss as through the skin in high environmental temperature, the lungs in overbreathing or the gastro-intestinal tract in vomiting or diarrhœa. Similarly, premature infants with immature kidneys would be likely unable to handle such a "strong" feeding. Human breast milk contains only about one-third of the solute load as does modified cow's-milk formula with additional carbohydrate. It seems likely that the premature infant discussed above was just able to get by on the one to two dilution of 2% powdered milk with water without added carbohydrate, but was unable to handle a one to one dilution of the same powdered milk formula.

After a few days of the high solute feeding the effect on the kidney is the same as that seen with acute water deprivation. Calcagno and Rubin[6] have shown that in infants simple water restriction causes reduction in glomerular filtration and renal plasma flow. This differs from adults,[5] who are able to increase the water reabsorption in distal tubules when faced with acute water deprivation.

The Committee on Nutrition of the American Academy of Pediatrics[9] has stressed the fact that concentrated feeding mixtures consisting of plain cow's milk, if not supplemented by additional water intake, provides less margin of safety against heat stress and other causes of increased water loss than do more dilute feedings. A milk formula prepared at the customary concentration[7] of 20 calories per ounce provides sufficient water to cover losses by all routes (190 c.c./kg.) and as Finberg[8] states, "the moderate dilution, with additional carbohydrate, is probably a more satisfactory safeguard than too much dilution with water alone because it provides a feeding mixture where the requisite calories are contained in a reasonable volume, minimizing problems from regurgitation and vomiting. In an era where self-regulated feeding is the vogue, satiety is achieved more readily, thus minimizing over-feeding with a too high protein and electrolyte intake."

SUMMARY AND CONCLUSIONS

A case of hypernatræmia associated with a feeding of concentrated formula in a premature infant is presented.

The dangers of feeding a concentrated formula are again stressed. Feedings prepared at the usual concentration of 20 calories per ounce with a moderate percentage of calories being provided by carbohydrate are usually quite safe.

During heat waves or periods of stress when there is loss of water from diarrhœa or vomiting, the osmolar load in cow's-milk formulæ should be reduced by dilution and the addition of carbohydrate, or the baby may be given carbohydrate drinks.

I wish to acknowledge the kind assistance of Dr. H. Bain in the preparation of this paper, and to thank Dr. R. Imrie for permission to publish the case.

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Special Article

SHELLFISH POISONING—ANOTHER NORTH AMERICAN GHOST*

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THE TITLE of this article is borrowed from a Fredericton naturalist, Bruce S. Wright, for "The Ghost of North America" was the title of his recently published book on the eastern panther. There are interesting parallels in the histories of shellfish poison and of panthers in our part of the world. Both seem to have been here always, and people living in the out-of-the-way places where panthers and poison occur have extensive practical knowledge about them. However, these people are not usually writers, so records of their experiences are scarce. Indeed, I have chosen my title quite deliberately to impress you with the scarcity and elusiveness of reliable information on our poison problem. It is not easy to trace its history.

FIRST REPORTED CANADIAN POISONING

I would like to quote an extract from what I believe is the first published account of shellfish poisoning in Canada.[1] This was written on June 17, 1793, by Mr. Menzies (naturalist and surgeon on the voyage of Captain George Vancouver) and concerned the activities of two small-boat parties sent from the main vessels to explore what is now Mathieson Channel on the coast of British Columbia.

"Near the head of this arm they stopped to breakfast on the morning of the 15th where the people finding some good looking mussels about the rocks and shores, boiled a quantity of them . . . . but unfortunately for them . . . . these mussels proved to be of a deleterious quality as all those who had ate of them in any quantity were, soon after they embarked, seized with sickness, numbness about the mouth, face and arms, which soon spread over the whole body accompanied with giddiness and general lassitude; this was the case with three of the crew of the *Discovery's* boat . . . . One of them, John Carter, puked a good deal, and found himself so much relieved by it that he kept pulling on his oar till about one o'clock when the whole party stopped to dine; but in attempting to get out of the boat he was so weak and giddy that he fell down and he and the other two were obliged to be carried to shore. On this, Mr. Johnstone instantly directed a fire to be kindled and plenty of warm water to be got ready as soon as possible, that each of them might drink a sufficient quantity of it to operate as an emetic . . . . but, before it could be got ready, John Carter became . . . . very ill . . . . his pulse becoming weaker and weaker, his mouth and lips appearing black and his face and neck becoming much swelled together with faintness, general numbness and tremor. Under these circumstances he gradually sank without much struggle and expired just as soon as they were offering him the first draught of warm water which he was unable to swallow, and this sad affair happened within five hours from the time of his eating the mussels."

Captain Vancouver's own writings[1] continue the account as follows:

"They stopped in a bay for the night, where they buried the dead body. To this bay I gave the name, Carter's Bay, after this poor unfortunate fellow; it is situated in latitude 52°48′, longitude 231°42′, and to distinguish the fatal spot where the mussels were eaten, I have called it Poison Cove, and the branch leading to it, Mussel Canal."

These names given by Captain Vancouver are to be found even on our present-day charts of the British Columbia coast.

EAST-COAST POISON AND CONTROL PROBLEMS

You have heard enough about the west coast! Now let me show you our ghost's east-coast stamping grounds (Fig. 1). They are all in two districts —first, the estuary of the St. Lawrence[2] (north and south shores) and second, the lower Bay of Fundy.[3] I have identified three types of areas in each district —those where shellfish sometimes contain poison, as shown from study of shellfish extracts; those where illnesses have occurred, following consumption of local shellfish, and those where there have been deaths from this cause. Some of the reports which I have summarized in this figure date back to the period 1800-1810. But from here on I shall discuss the poison problem only as we have known it in recent years in New Brunswick sections of the Bay of Fundy district.

The last rumbling we heard from our ghost in the Fundy area was in 1958. That year there was one case of illness. A man was hospitalized in Saint

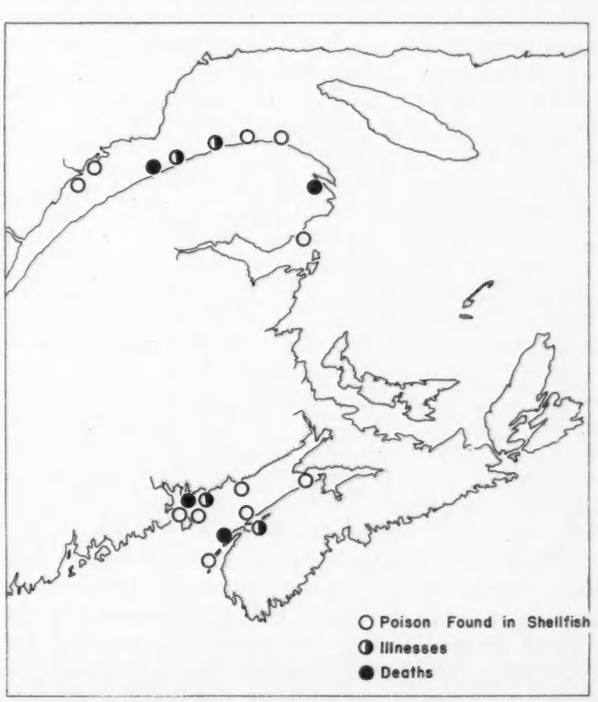

Fig. 1.—Eastern Canada showing the two districts affected by paralytic shellfish poison.

*Address to the New Brunswick and Prince Edward Island Branch of the Canadian Public Health Association, Fredericton, N.B., April 30, 1959.

†Head, Molluscan Shellfish Investigations, Fisheries Research Board of Canada, Biological Station, St. Andrews, N.B.

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John. In 1957, however, our ghost really walked.[4] Over one week-end, 27 New Brunswickers took sick for periods ranging from a few hours to nearly three weeks. Twelve years before that, in 1945, there had been another burst of illnesses.[3] A smaller group of New Brunswickers ate the same varieties of shellfish from the same places at about the same time of year and this brought on what we believe was the first east-coast outbreak of shellfish poisoning that could properly be called an epidemic. This 1945 epidemic created a real stir.

Just at that time there was a search under way to discover and study the marine organism responsible for the poison that had been found for a month or two every summer in shellfish in certain parts of Charlotte County, N.B. This search was being conducted by an unpaid volunteer worker at the Fisheries Research Board's Biological Station at St. Andrews, N.B. That worker was Mrs. Needler. The Fisheries Research Board provided her work space in the station laboratory and she got encouragement from the Department of Fisheries and from the Department of National Health and Welfare. The last two agencies were co-operating with other members of our station staff in studying other aspects of the poison problem.

Mrs. Needler's work was extraordinarily successful.[5] She found a one-celled flagellated plant that appeared in the plankton about the time the summer water temperatures approached their peak and disappeared soon after. The time of occurrence of this plant coincided exactly with the time when poison was present in the shellfish. This discovery fitted in with and explained many of the findings that others of our team were making. We had found a "key station" where the shellfish nearly always became poisonous earlier than elsewhere. We decided to use this in the same way our Defence Department would use the DEW line. The three government agencies agreed to maintain a regular sampling of shellfish at this key station, to close down commercial harvesting of clams (*Mya*) when poison appeared in them and to keep the clam-producing areas under quarantine until the danger passed. Clams were the only commercially important species of shellfish that were affected.

Everyone seemed satisfied with this control system once it was established. It was expensive to maintain but it permitted almost full commercial exploitation of our clam resources and afforded good protection to consumers of the commercially marketed products. Besides this, the Department of Fisheries posted signs during the danger periods, warning tourists, picnickers and other non-commercial clam diggers, who might be inclined to go gathering dangerously poisonous shellfish. Thus the clam industry prospered and all clam consumers were protected or at least warned of the risks of poisoning. Most people thought there was no need to continue investigations when we had such a good control system. And it was good—better than in most countries, because we had been able to work out the pattern of the annual recurrences of the poison. So work of the type Mrs. Needler had been doing stopped but routine control work went on smoothly year after year.

Canada
Department of Fisheries

WARNING
SHELLFISH AREA
CLOSED

As the Department of National Health and Welfare has determined that clams taken from

.....

area are affected with paralytic poison, this area is closed for the taking of clams except for use as bait or for treatment by the canning process; and is closed for the taking of mussels for human consumption.

G. R. CLARK,
Deputy Minister of Fisheries.

Notice Posted

.....19..... .....

(Fishery Officer)

Anyone found guilty of defacing this poster will be prosecuted.

There is a tendency for picnickers to develop immunity to signs just as flies develop immunity for DDT. And it doesn't matter whether the sign says "No Trespassing" or "Poisonous Shellfish". Nothing happened for a long time. However, if you could have visited Lepreau Basin at low tide on June 22 or 23, 1957, you could have witnessed the last scene of a little drama that everyone mistook for a farce. There you would have seen happy picnickers, mostly from Saint John, clustered around cooking fires along the margin of the beach. Some were roasting or shelling and eating clams. Others were reclining on the beach in the pleasant spring sunshine or in the shade of the red warning signs. The rest of the story you know. It was reported in last year's July 1 issue of this Journal.[4] No picnickers died, fortunately, but many became ill enough to be very, very interesting "cases".

For us, the important point is that the control system worked, in 1957, just as its design would call for—poison was detected by the Laboratory of Hygiene in extracts of shellfish prepared at the St. Andrews Fish Inspection Laboratory, and the Department of Fisheries, as it had agreed, put out bright new signs to warn the picnickers who swarmed down the beaches. But, although the system worked, it obviously did not work as it was intended to. The designers had made an important mistake (as so many of us make mistakes) in basic assumptions. They assumed that because picnickers would see the signs, they would read them. They also assumed that when picnickers read the signs they would follow the advice and not eat clams. People, of course, are often not that reasonable, and so we had our 1957 epidemic of paralytic shellfish poisoning.

I must emphasize that as far as control of the industrial harvesting was concerned, the system

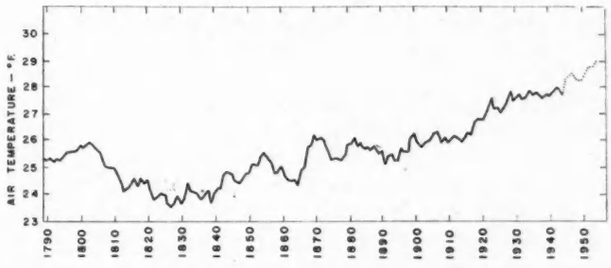

Fig. 2.—Glude's[6] figure showing trends in mean winter air temperatures in the northwest Atlantic region since 1790.

did work very well. The trouble stemmed almost entirely from picnickers.

CONTROL IMPROVED

In 1958 and 1959, there was a much better effort to protect picnickers in the Fundy area. This was instituted by Mr. R. M. Bond of the Fish Inspection Laboratory at St. Andrews. This responsibility had been assigned to him and warning signs were put out as before. But besides this, health officers were informed and newspapers and radio and television stations issued warnings as soon as the danger appeared imminent. All these kinds of warning work in different directions and they must continue as a necessary part of our control system. Still, we are not quite happy with our ghost—some of us, at least, are not.

HOW TO STRENGTHEN CONTROL

Since 1957 we have become aware of other needs besides that for information and education of the public. You begin to hear people saying that we should be in a position to make better forecasts and provide earlier warnings. There is a feeling that our system needs strengthening and now there is reason to believe that this need is increasing.

Let me show you what I mean. From Fig. 2, which comes from another author,[6] you will note that from about the year 1830 to 1955 our coastal climate was slowly warming. Hydrographers and climatologists assured us several years ago[7] that, beginning about 1955, this trend would be reversed and that a period of cooling would set in and would last approximately 25 years. What we have experienced since 1955 certainly bears out that prediction. The change is quite apparent in the Bay of Fundy. Yearly average water temperatures have been decreasing. Fig. 3 suggests how this change may affect the poison picture. I am not sure how much faith to put in this graph but if it has any meaning at all it is ominous. It indicates that in summers following cold winters the poison conditions are worse than in summers following mild winters. With what the hydrographers have predicted our graph carries this important warning—in the next 25 years we must expect not only colder winters but also worse trouble from shellfish poison. In the face of this you must agree that we should prepare ourselves to meet the trouble with the best forecast and control systems we can devise.

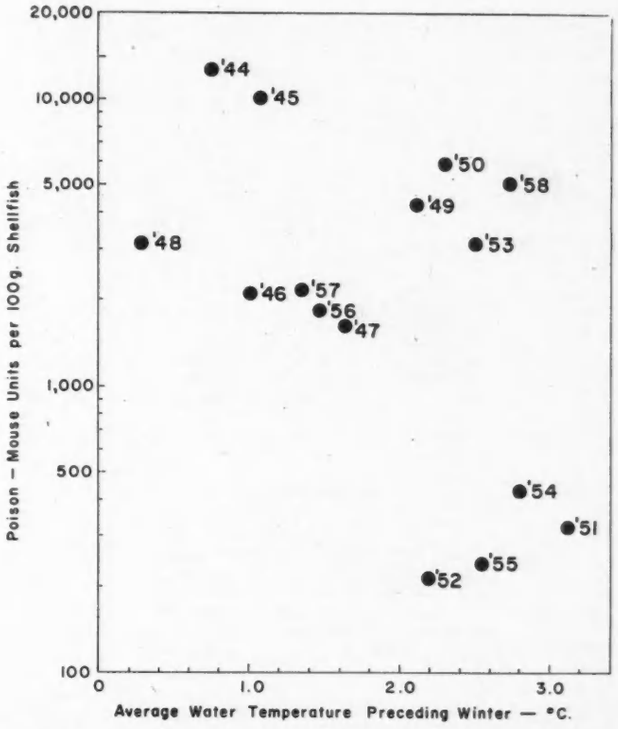

Fig. 3.—Relationship between annual means for poison content of all mussel samples taken at the Key Station (Head Harbour, N.B.) and means for water temperature (Biological Station wharf, St. Andrews, N.B.) for the three months of the preceding winter.

Besides being able to predict the danger period for each year we should try to find out how to forecast the level of the danger during that period. As we have seen, picnickers come to regard government warnings of danger as purely perfunctory and will sometimes completely disregard them. In case this disregard should become common in any particular year, it would be well to have some idea whether we should then expect to encounter only an occasional case of poisoning or a full-scale epidemic. If we knew that the danger in a particular year was likely to be great, the warning effort could be increased to ensure adequate control.

In the last few years we have found that our present method of forecasting sometimes provides a dangerously short warning period. With the climatic changes that are going on, we really should try to devise a longer-range method to provide more time, not only for the routine work of closing down commercial harvesting and posting dangerous areas with signs warning picnickers, but also for the recently adopted and more time-consuming types of warning through public health officers, newspapers, television and the like.

I think I have said enough about the parts of our control system which could be strengthened. Our system is good but no system is good enough if it can be made better at reasonable cost. So the next question is—how can we make it better?

KEY TO BETTER FORECASTING

The basis for our current forecast of when shellfish will become dangerously poisonous is the demonstration that they already contain sub-

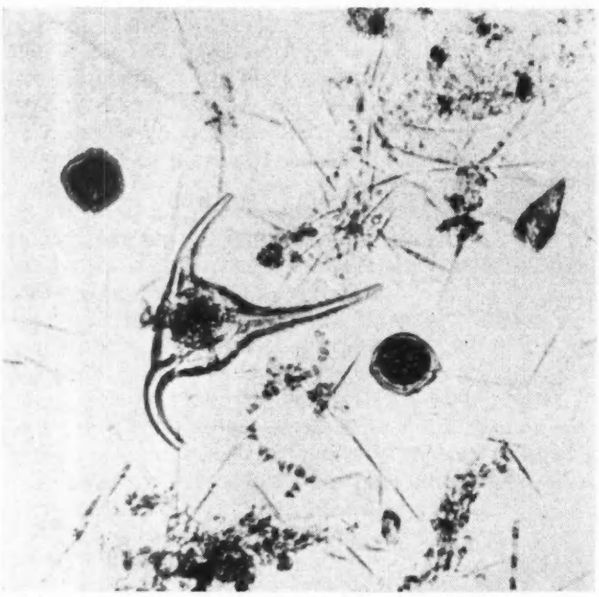

Fig. 4.—Photomicrograph of two specimens of the dinoflagellate, *Gonyaulax tamarensis* (actual diameter 40 μ), with other plankton organisms.

stantial and increasing amounts of poison. This demonstration is possible only at a late stage in a long chain of events that can end in trouble—a population of the causative organism must have built up in the sea, shellfish must have fed on it and accumulated poison digested from it, and collectors from the control agencies must have sampled the shellfish and submitted them to several time-consuming treatments before shipping extracts of them for assay to the Laboratory of Hygiene several hundred miles from the coast.

From reviewing Mrs. Needler's valuable work I feel almost confident that this elaborate system could be simplified. Here (Fig. 4) is the organism she considered to be basically responsible for all our trouble in the Fundy.[5] It is the dinoflagellate, *Gonyaulax tamarensis*. I do not know whether she was aware of it or not, but 12 years before she published her report Sommer[8] and his California co-workers suggested that this species might be responsible for poisonings in northern Europe. My belief is that we should re-open Mrs. Needler's investigation. If we could discover (1) the conditions which permit the development and maintenance of a population of this organism and (2) the conditions which determine the density of that population, once it establishes itself, then we would have everything we have been looking for as a basis for a long-range forecasting system.

I think there is a reasonable chance of discovering these. Furthermore, I think it would be cheaper, in the long run, to monitor these conditions and do the necessary forecasting than to maintain our present complex system that may break down sometime in the next 25 years when we need it most.

My guess is that the biology of dinoflagellate populations should be the first target of any research that aims to improve our control system. This is not a new idea by any means. The west coast Indians are said to have had a warning system[9] based on their own methods of estimating the abundance of dinoflagellates. They had no microscopes, but their system apparently worked. We are told that they watched the sea at night for luminescence. This is caused by dinoflagellates that often accompany *Gonyaulax catenella*, the source of shellfish poison in Pacific coast areas. When they observed a brilliant night glow in the sea they are said to have given up eating clams until they considered them safe again. They knew our ghost and when it walked.

SUMMARY

The history of paralytic shellfish poisoning in Canada, especially in Bay of Fundy areas, and of research on the causative organism, *Gonyaulax tamarensis*, is reviewed. The Government's control of this public health hazard is outlined and it is predicted that the hazard will be greater in the next 25 years. A biological study of *Gonyaulax* might discover better methods of predicting annual danger periods and the level of toxicity of shellfish.

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SHORT COMMUNICATION

A SCHEME FOR OBTAINING AN OBSTETRICAL HISTORY FROM FOREIGN-SPEAKING PATIENTS*

A. DAVID CLAMAN, B.A., M.D., C.M., F.R.C.S.[C], *Vancouver, B.C.*

DURING THE past 10 years a large number of immigrants who do not speak English have settled in Canada. They sometimes suffer a disadvantage as patients because they cannot communicate a history. The usual solution of securing an appropriate interpreter is not always possible.

On reflection it is obvious that in any particular medical field only relatively few questions are ordinarily required to elicit crucial information. We have therefore designed such a list of questions for obstetrical patients, and arranged for their translation into Italian, German and Hungarian

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(which correspond to our local new ethnic groups who speak little English).

The questions were further designed to elicit a "yes" or "no" response, or an easily intelligible one. The translators were instructed to use non-scientific colloquial language as far as possible. We have found it useful to have a physician who speaks the appropriate foreign language check our translations and make sure that they convey the correct idea. Our list of questions is not yet complete, and we intend to revise them with further experience.

We learned further that when we were about to undertake a simple procedure, such as catheterization or intravenous medication, without explaining what we intended to do to the patient, he would be understandably fearful and therefore not able to co-operate fully. We therefore designed an additional list of simple statements to explain such procedures, and a few common, necessary instructions.

The relationship between doctor and patient is immediately improved when the patient observes that an attempt is being made to communicate with her in her own language. Furthermore, with a little effort and by having the patient read aloud the actual questions themselves, in a short time one can learn the correct pronunciation; for that matter, after repetition, the questions can be remembered in the appropriate language without recourse to the actual printed sheet.

A mimeographed sheet of questions and a separate sheet of these simple statements in each language were placed back to back and enclosed in a transparent folder. These were made available on all our obstetrical stations, and in the outpatient department and case room. We have also provided them to private practitioners on request.

A similar set of important questions arranged sequentially could be composed for other fields, such as E.N.T., pædiatrics, anæsthesiology or urology, where often only certain information is particularly desirable.

The following is a sample to illustrate the scheme.

ITALIAN HISTORY SHEET

(The questions listed below are designed to elicit a "yes" or "no" response, or an easily intelligible one. If the pronunciation is difficult, it may be asked by pointing to the appropriate question.)

1. How old are you?
   Quanti anni ha?
2. How many children have you had?
   Quanti figli ha?
3. How old are your children?
   Quanti anni hanno?
4. What were their birth weights?
   Quanto pesavano quando sono nati?
5. Were there any complications? What were they? Was there any high blood pressure?
   Ci sono state delle complicazioni nel parto? O nella gravidanza? Alta pressione del sangue?
6. Did you have a long labour? How long?
   Ha avuto le doglie per molto tempo? Quanto?
7. Is there any high blood pressure in your family? Diabetes?
   C'è nessuno con l'alta pressione nella sua famiglia? O con il diabete?
8. When was your last menstrual period?
   Quando ha avuto le ultime menstruazioni?
9. When did your contractions begin?
   Quando le sono cominciati i dolori?
10. How often do your pains come? Do you feel them in the back?
    Quanto spesso le vengono? Ha dolori alla schiena?
11. Have you been vomiting? Very much?
    Ha vomitato? Molto?
12. Has there been any water come away from the vagina? When?
    Ha avuto perdite di acqua? Quando?
13. Have you been bleeding from the vagina? Very much?
    Ha avuto perdite di sangue dalla vagina? Molte?
14. How much weight have you gained in this pregnancy?
    Quanto peso ha guadagnato durante questa gravidanza?
15. When was the last time you had anything to eat or drink?
    Quando ha mangiato o bevuto per l'ultima volta?
16. When was the last time you passed urine? When was the last time you had a bowel movement?
    Quando ha urinato l'ultima volta? Quando è andata di corpo?
17. Do you have pain here? (Pointing)
    Sente dolore qui?

STATEMENTS

1. Do not be afraid.
   Non abbia paura.
2. We are going to do a Cæsarean to deliver your baby.
   Dobbiamo fare una operazione per tirar fuori il bambino.
3. We are going to give you an I.V.
   Ora le facciamo una iniezione endovenosa.
4. We are going to catheterize you.
   Ora la catetrizziamo. (Les mettiamo un tubo nella vescica per fare uscire l'urina.)
5. We are going to give you an enema.
   Ora le facciamo un clistere.
6. You must not eat any salt.
   Lei non deve assolutamente mangiare sale.
7. You must remain in bed.
   Lei deve rimanere a letto.
8. Do you want to have your baby circumcised?
   Vuole che il suo bambino sia circonciso?
9. Do you want to breast feed your baby?
   Allattera il suo bambino?

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ASSESSING THE QUALITY OF MEDICAL CARE

One of the valid criticisms of hospital accreditation programs has been that while certain definite criteria have been established for assessing the quality of surgery, obstetrics and gynæcology, there were few recognized standards for judging the quality of internal medicine. There have been two major reasons for the apparent inequity. Since the accreditation program developed from the program of hospital standardization which was created and developed by the American College of Surgeons, it is not unnatural that stress should have been laid upon the quality of surgical care and yardsticks developed for measuring it. If this were the only reason, it might have been expected that when the program was taken over by the Joint Commission on Accreditation of Hospitals in 1953, the discrepancy would have disappeared and there would have been established then as good yardsticks for measuring the quality of medicine as those being used to judge surgery. That this desired change has not yet been made is sufficient evidence of the second reason for continuation of the imbalance in assessment of care. The reason is simply that while measuring devices are comparatively easy to develop where technical procedures are involved, it has been most difficult to develop valid quantitative norms where tangible acts are less evident, as in the practice of internal medicine.

Interest in the subject has not, however, been dormant, and the most recent as well as the most significant work on the problem is the report of the American College of Physicians Committee for the Study of Hospital Standards in Medicine. The committee's work was supported by a U.S. Federal Health grant and was carried on over a three-year period. Some of their conclusions are summarized in an editorial in the October 1959 issue of *Annals of Internal Medicine* which foresees for the report wide publicity and well-deserved public recognition.

To those physicians who have been interested in promoting quality of care in their hospital according to the standards of the accreditation program and are persuaded of the validity of the basic principles upon which those standards are based, it will come as no surprise to recognize in the conclusions of the committee echoings of basic accreditation program concepts: that there should by systematic review of the records of hospital patients; that the quality of care must be assessed, not merely the quality of records; that the assessment must be made by physicians on the hospital's own medical staff who are competent to do so; that staff education and improvement in patient care go hand in hand, and that the earnestness of a hospital's effort can be judged by an outside agency. The "outside agency" meant, of course, is the accreditation program. The proof is that the committee recommends that a revised appraisal plan and report form be presented for the approval of the Joint Commission on Accreditation of Hospitals, and subsequent use in the accreditation program. "In that event, a hospital's performance in general medicine will be judged by the earnestness with which they appraise their own practice."

In these days when the newly established Canadian Council on Hospital Accreditation is doing so much to promote the principles and practice of assessment of quality of care by physicians themselves, this report is most timely. It does more than justify the accreditation program's basic premise that "the medical staff is responsible for the quality of all medical care rendered to patients in the hospital and for the professional practices of its members". It goes further and suggests that in general medicine as in surgery, criteria for assumption of this responsibility can be based on the same principles, and it probably means that before too long the standards will be amplified to make this assessment possible. As the basic principles for accreditation of hospitals are the same in the United States and Canada, we shall await with interest the reception of this committee's report by the Joint Commission, and expect that suitable action then will be taken by the Canadian Council on Accreditation of Hospitals.

Editorial Comments

HYPERTENSION—TREATED AND UNTREATED

The management of hypertension has undergone significant changes during the past two decades. Until then, there seemed to be no disposition to separate the different forms of this syndrome with a view to intelligent diagnosis and management, and all patients with hypertension were treated—or untreated—in the same way.

During the earlier portion of that period, we experienced a "restriction of activity" phase, a "phenobarbital" phase and a "salt-restriction" phase. As time went on and extensive studies were carried out in the field of experimental hypertension, the realization grew, partially stimulated by Goldblatt's monumental work, that hypertension could result from a variety of conditions. These included chronic inflammatory or degenerative renal disease, unilateral renal "ischæmia", and functioning tumours of various types, such as phæochromocytoma and carcinoid tumours; and specific methods have been devised to deal with some of these forms of hypertension. This situation has produced a certain degree of shrinkage in the volume of what we must still designate as "essential hypertension"; but, even when the known causes of hypertension are excluded, the number of cases of "essential" hypertension is appallingly large.

A further phase in the management of essential hypertension, lasting less than a decade, was concerned with surgical methods of autonomic denervation and, for some time, sympathectomy of varying degrees of magnitude was extremely popular. Only the discovery and development of potent pharmacodynamic agents with demonstrable and reproducible antihypertensive effect has decreased the popularity of the surgical approach, although there are still a few situations in which autonomic denervation is the treatment of choice for this disease.

For the past few years we have run the gamut of one antihypertensive agent after another, including the reserpine preparations, veratrum alkaloids, ganglion-blocking drugs, the hydralazines, and finally the newer diuretic agents. At present no single antihypertensive drug is advocated by any serious student of this problem and various combinations of pharmacological agents are usually advised.

There is a general feeling among students of this disease that we now have sufficient information concerning the efficacy of the various forms of treatment of hypertension to enable us to determine whether or not our efforts have met with any success. Specifically, we wish to know whether we have been prolonging the useful life span of any of our hypertensive patients, whether these lives have been spent in any degree of comfort, or whether, in effect, "the cure has been worse than the disease". We are pleased to report that at least three recent publications have contributed valuable information on these points.

A British study of 402 patients with treated and untreated hypertension has appeared in a recent issue of the *British Medical Journal*.[1] The treatment in this series consisted of either lumbo-dorsal sympathectomy or ganglion-blocking agents. Of 211 *untreated* patients, followed up from 1946 to the present time, half are now dead. Comparison of this group with a group of similar size *treated* by sympathectomy or ganglion-blocking agents indicated that, except in malignant hypertension, the mortality rate among treated patients was in no instance appreciably higher than one-third that of untreated cases. The results were somewhat better with sympathectomy than with ganglion-blocking agents, but there were ancillary factors that led the writer to the conclusion that the use of ganglion-blocking drugs is fully justified only in *male* hypertensive patients with a diastolic pressure consistently above 120 mm. Hg. His findings suggested that, in women, treatment is not normally required until the diastolic pressure is 130 mm. Hg. More will be said on this point later.

In the same journal, two other workers[2] report their results in the treatment of 104 patients having significant essential hypertension, with ganglion-blocking drugs. They conclude that the natural history of hypertensive disease is influenced by many factors apart from the height of the blood pressure and that the presence or absence of certain complications greatly affects the prognosis. Nevertheless, they emphasize the importance of lowering blood pressure continuously and effectively. Because their results with the use of ganglion-blocking agents were considered to be equivocal, they suggest that the use of such drugs in symptomless hypertension without demonstrable disease of the retina, heart or kidney should be restricted to young male patients.

Another study, carried out by American workers[3] and emphasizing the variations in renal function in treated and untreated patients, has also recently been reported. It would appear from this investigation that one of the inexorable consequences of untreated malignant and non-malignant hypertension is a decrease in renal blood flow and glomerular filtration rate, and it is stressed that pharmacotherapy should be instituted as early as possible to prevent the occurrence of such changes in renal hæmodynamics. The importance of impairment of renal function as a factor in prognosis equal to, if not greater than, control of blood pressure itself is also emphasized, as in the previous contribution.

Despite the explicit statements about the value of pharmacological agents in the therapy of essential and malignant hypertension, there runs through all these papers the tacit or implied suggestion that only patients with severe hypertension, or those with an otherwise poor prognosis, should receive such treatment. With this suggestion we strongly disagree. It is true that, in a certain proportion of patients, undesirable side effects of some of the antihypertensive agents are almost ubiquitous and leave one with the suggestion that "the cure is worse than the disease". This, we believe, is the result of reliance on ganglion-blocking drugs as the major therapeutic agents in the management of hypertension; and it is well known that the undesirable side effects of these drugs are striking, extremely uncomfortable and, in some individuals, prohibitive. We believe that a satisfactory antihypertensive effect can readily be obtained by the use of various combinations of reserpine and chlorothiazide preparations, usually, but not always, with the addition of adequate dosage of hydralazine. We believe, also, that such combined therapy will result in fewer and less severe side effects than with any of the ganglion-blocking agents now in use. At present, it would appear that the ganglion-blocking agents should be reserved for the most severe cases of hypertension, those which do not respond to the

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agents mentioned, or those in whom for some reason such as anginal pain, the hydralazine preparations are contraindicated. In these patients the disease is usually so advanced and the complications have assumed such importance that no form of therapy capable of improving symptoms and prognosis could be considered "worse than the disease".

Finally, we must emphasize that hypertension is a progressive disease and that, in the present state of knowledge and with our present armamentarium of drugs, progression will be halted or slowed, prognosis improved, and the patient's general comfort enhanced, if treatment is begun early, rather than when many of the pathological changes are irreversible.

S. J. SHANE

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WHY PRIMARY TENDON REPAIR?

For years much incertitude has existed as regards the sites at which, and the conditions under which, primary tendon repair should be undertaken. One of the most recent and authoritative collections of papers on the subject is to be found in the June 1959 issue of the *Journal of Bone and Joint Surgery*. Here are to be found detailed reports and analyses by men such as Mason,[1] Boyes,[2] Fowler,[3] Kelly,[4] and Holm and Embrick.[5]

Even if prime indications exist, the hazards of attempting these repairs, except under optimum conditions, must be borne in mind. Any surgeon who might be called upon to carry out this procedure could undoubtedly derive some benefit from reviewing the experiences of these authors. There is little evidence that repair of a tendon at the time of injury results in any better function than a properly performed secondary repair or reconstruction. At the same time, there is ample evidence that in some instances more normal function results if repair is never attempted.

Granted that usually four to six hours is the upper limit of time from injury even when the laceration is apparently clean, primary tenorrhaphy is still not justified if the history or handling in the interim suggests potential contamination. The area in which the tendon is damaged is of prime importance in considering the repair. Although some difference of opinion still exists, the criteria and zoning described in these reviews are those generally accepted. The majority of surgeons will agree that primary repair should not be carried out in the zone where sublimis and profundus tendons lie together in the fibrous digital sheath.

It should go without saying that if tendon severance has not resulted in loss of function, surgery is wasted time and effort. It must also be remembered that repair may result in more disability than if the original injury had been left alone. Severance of the profundus tendon in the middle segment of the finger results in a lack of flexion of the distal joint and lack of stability of pinch. Direct repair with attempts at rethreading the tendon through the intact sublimis will almost always result in some loss of function of the sublimis and thus also result in partial limitation of flexion of the middle interphalangeal joint. Whereas originally there was only loss of simple flexion, the patient would now have impaired function of the whole finger. A tenodesis or arthrodesis of the distal joint to ensure at least stability of the distal joint would not have jeopardized the remaining function of the finger. It is essential to remember the natural reparative ability of certain tendons which are surrounded by paratendon and the excellent results that can be obtained by splinting alone. The common toe extensors and the extensor hallucis longus are examples of those which should never be repaired.

Although it is conceded that results of extensor tendon repairs are more gratifying than those of flexor tendon repairs, those achieved in many series appear good because the repairs in the critical areas are lost in a profusion of those in non-critical areas. Premature discarding of splints is often the major cause of poor results. An internal splint of Kirschner wire is gradually becoming accepted as the best apparatus for securing immobilization after extensor tendon repairs in distal phalanges.

One of these papers is a very comprehensive analysis and correlation of anatomy and function of the 38 various muscles of the hand which are so delicately co-ordinated and balanced. In assessing any hand injury, careful thought must be given to the actual pathology in deciding on the reparative procedure of choice. This is based on the anatomical peculiarities of the various areas which dictate the course to be followed.

Research which has been done on fresh unembalmed cadavers illustrates that whereas primary repair may be possible in the sheath-lumbrical interval when laceration is sustained in complete extension, if the fingers are in complete flexion this is not desirable. This is because extension of the fingers enough to carry out repair would draw the site of anastomosis into the fibrous digital sheath. Consideration of the complex and complicated movements of the hand should emphasize why functional studies of this kind are so pertinent in hand surgery.

One conclusion worthy of emphasis that even the well-trained surgeon should come to is that all cases for secondary tendon grafting should be referred to a hand-surgery service. It should go without saying that a hand injury of any magnitude with tendon involvement should be referred at least to a surgeon cognizant of the functional anatomy of this intricate breadwinning mechanism.

ALLAN M. DAVIDSON

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STANDARDIZATION—A SLOW PROCESS

In February of last year the Canadian Government Specifications Board accepted the recommendation of the International Organization for Standardization concerning the colour coding of medical gas cylinders (ISO/R32, 1957). It is expected that the U.S. Department of Commerce will complete arrangements for bringing their colours into line in the near future. At the same time the Canadian Government, in their notification 24-GP-2, made official the Pin Index System. It has taken a fantastic amount of time, energy and perseverance to bring about the adoption of even these two items.

Francis Bacon (*New Atlantic*, 1627) suggested a "model organization not really to bring men together but to get them to work in common on the tasks most important for Science". For the standardization of equipment, this is indeed necessary; groups at work on these problems include scientists, industrial representatives, physicians, lawyers and government representatives. Francis Bacon would undoubtedly have advised that a philosopher serve on the panel; that vacancy today is filled by the government representative. Bacon realized that progress in science could be made only through co-operation and organization, and he pointed the way to organized scientific endeavour (*The Scientific Revolution*, 1500-1800; A. R. Hall).

Such demands have been made in recent years upon the practice of anæsthesia that there has been a great increase in the variety of equipment used. Standardization is a natural and necessary sequence of these advances when it involves such things as the uniformity of parts, interchangeability of fittings, nomenclature, marking, safety factors and standards of efficiency. Such a degree of standardization of anæsthetic equipment is most desirable but it must not be allowed to interfere with individual thought and enterprise. In some respects it replaces improvisation, though it is to be hoped that this ability will never be entirely lost.

Davis and Kretchmer[1] are to be heartily congratulated upon their industry in compiling a contemporary review of the standardization of anæsthesia equipment. Dr. Hamilton S. Davis is the chairman of the Committee on Standardization of Anesthetic and Resuscitation Equipment of the American Society of Anesthesiologists and chairman of the American Standards Association section dealing with this subject. Dr. Henry E. Kretchmer is chairman of the Subcommittee on Standardization of Anesthesia Equipment for the A.S.A. That their report is so comprehensive is therefore natural; they urge a uniform means of testing for compliance with adopted standards, to guide both the manufacturer and consumer, to the ultimate benefit of the patient, with however no restriction of freedom of design.

In the U.K., in spite of pounds, shillings and pence; inches, feet and yards; pounds and stones; standardization had its origin in 1901 when it was, to start with, mainly industrial. Since then there have been pioneering efforts in the field of anæsthetic equipment. Such items as colouring of cylinders, uniformity of syringes, transfusion apparatus, conductive rubber and anæsthetic trolleys were among the first. Later interests included the shape, size and material of oral airways, endotracheal tubes and their connections, and metal joints and mounts, while the performance after sterilization, storage and the use of lubricants is a feature of current importance.

Similar projects are being undertaken in the U.S.A. where the investigating body is the American Standards Association, sectional committee Z-79, which is sponsored by the A.S.A. Liaison has been established between the British and American committees; at the same time both are interested in the recommendations of the I.S.O.

In the U.S.A. the ultimate uniformity of medical gas cylinders was largely achieved by the endeavours of the indefatigable Dr. Paul M. Wood. The Pin Index system, which must already have saved lives, was due to the perseverance and foresight of Drs. Philip Woodbridge and Ralph Tovell. Also should be mentioned the work of Dr. George J. Thomas and again of Dr. Ralph Tovell in the measures they have advocated to overcome the hazards of fire and explosion. In Canada there is frequent contact between the Secretary of our Society of Anæsthetists, Dr. R. A. Gordon, and other interested parties.

Anæsthesia, which is one of the youngest of the medical specialties, is no exception to the evolution followed by other divisions of our profession, in that observations, experimentation and clinical experience are followed years later by system. S. Weir Mitchell[2] in an address entitled "The Early History of Instrumental Precision in Medicine" deduced from the facts he presented that the watch was the first standard medical instrument. He noted that Herman Kepler first counted the pulse according to our standard time factor, though previously many differing forms and qualities had been identified. William Harvey, he mentioned, assessed the pulse rate at 1000-4000 beats per half hour while others recorded the pulse as it was counted for a sixteenth part of an hour. Similarly, respiration was not counted until years after numerous observations concerning its quality had been described. Laennec only once in all his works mentioned the rate of respiration.

With apparatus of precision quality and judicious standardization it is hoped that anæsthesia will be universally safe for the patient and produce an optimal field for surgery.

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Medical News in brief

SOME ASPECTS OF ANGINA PECTORIS

In the first Thayer lecture for 1959 given at the Johns Hopkins Hospital, Harrison discussed clinical and physiological aspects of angina pectoris (*Bull. Johns Hopkins Hosp.*, 104: 275, 1959). The diagnosis of this disorder becomes difficult when it is associated with skeletal pain, especially in the left shoulder or chest or left arm. Often the response to glyceryl trinitrate is of crucial importance and has to be combined with walking tests with or without electrocardiograms (E.C.G.). Harrison believes that the transient appearance of a markedly depressed or down-sloping S-T segment in the E.C.G. is strong evidence for myocardial ischæmia. Depression of the S-T junction by one-half to one millimetre followed by upward slope to a normal T peak was observed by him in many normal subjects and is not likely to be significant. Recording the precordial movements during anginal attacks may disclose a systolic bulge during the early part of ejection. This is believed to be due to loss of contractile power and passive ballooning of flabby, ischæmic ventricular muscle. An increased atrial contraction also seen sometimes during attacks is believed to be due to weakness of the ventricular muscle, and is the only other abnormality which has been studied in any detail. It is not as yet known whether these two changes in the kinetocardiogram are sufficiently constant and specific to be of diagnostic importance. The anginal episode appears to have a double effect on ventricular action; it impairs the contraction of the ballooned-out region and reduces effectiveness of the healthy myocardial fibres. Both quick-acting and long-acting coronary dilators (glyceryl trinitrate in ointment form, Peritrate) can be readily demonstrated to improve the records of precordial motion. Nitroglycerin ointment applied thinly on the chest, abdomen or thighs every three to six hours exerts a favourable effect on frequent attacks at rest, on status anginosus and on pre-infarctional angina. Exercise, especially after sublingual administration of a pill of glyceryl trinitrate, was observed in a number of patients to develop increased exercise tolerance. Physical exertion, however, should be limited to that which does not cause pain. Although the electrocardiogram, ballistocardiogram and, recently, the study of precordial movements are all making certain contributions to the diagnosis and better understanding of angina pectoris, there will always be cases which defy recognition by objective methods. Meticulous history-taking and careful observation of the circumstances which induce and relieve pain will enable one to come to a correct decision.

HALOTHANE (FLUOTHANE)— A POTENT ANÆSTHETIC

The relatively new potent halogenated ethane, $CF_3CHClBr$, known as trifluorochlorobromo-ethane or halothane (Fluothane), has been under clinical investigation since late in 1956. Abajian and associates (*J. A. M. A.*, 171: 535, 1959) report their experiences with halothane (Fluothane) in more than 5000 cases. Atropine was not given routinely preoperatively but only in the presence of moderate bradycardia; halothane was administered with oxygen alone in a semi-closed system; intravenously given barbiturates were not employed. When concentrations are never allowed to exceed 2%, halothane is a safe and predictable anæsthetic. It permits smooth induction, absence of salivary and bronchial secretions, adequate muscle relaxation for most surgical procedures, early return to consciousness, and minimal vomiting. Hypotension is not a problem. The length of time and the concentration of the agent are the most reliable indicators of the level of anæsthesia. For example, 10-15 minutes of a 2% halothane concentration almost consistently produces second-plane, third-stage anæsthesia. The use of open-drop or closed system methods was stated to be fraught with great danger to the patient.

A Canadian group, however, has reported that it is preferable to administer atropine to avoid cardiac irregularities and hypotension; that an agent with a working range of concentrations under 2% requires microtechniques and that such techniques are potentially dangerous; that muscle relaxants were necessary in abdominal surgery because relaxation is not adequate in the lighter planes of anæsthesia and when it is satisfactory in the deeper planes, hypotension and hypopnœa usually develop (*Canad. M. A. J.*, 80: 973, 1959).

COMMON COLDS IN DENMARK

During the three-year period 1951-54, a morbidity survey was made throughout Denmark somewhat on the lines of the one made in Canada. A number of communications about the data are still being recorded, and a recent one concerns the common cold in Denmark (*Danish M. Bull.*, 6: 214, 1959). As a result of questions addressed to a sample of over 15,000 persons, some rather surprising epidemiological data were uncovered. The overall percentage of males who denied that they ever had a cold was 10.2, whereas for females the figure was 9.0. To this should be added another 11 and 12.7% respectively, for persons who said that they rarely had a cold. Percentages for those claiming to have a cold once a year were 23.9 and 24.9 respectively, and for twice a year 32.5 and 30.9 respectively. Of those who said that they had many colds a year, there were 22.4% females and males. It is also interesting to observe that in rural areas many more people had frequent colds than in provincial towns or the capital city. The survey also showed that, for both sexes, the cold recurrence frequency is higher in younger persons.

A study was also made of the connection between poor housing and the frequency of colds, and this showed that the number of persons catching cold was for both sexes about 2% higher when they lived in inferior dwellings; moreover, those living in such conditions were more often attacked. Only 4.6% of those catching cold do so in summer, while the others have their colds distributed over the rest of the year. The percentage of those who usually had a catarrh with complications was 40 for males and 44 for females, and the incidence of complications fell off with age. Of the total 76.7% said that they were never absent from work for colds, although the figures were larger for those living in the country.

(Continued on advertising page 23)

NEW DRUGS

This listing of new products is based on information received from Dean F. N. Hughes, Faculty of Pharmacy, University of Toronto, and the *Canadian Pharmaceutical Journal*, to whom we owe thanks.

TRANQUILLIZER

Levopromazine: NOZINAN, 2 mg. (Pr), Poulenc

Description.—Neuroleptic effective as antalgic, neurostatic, antihistaminic, potentializer and neuroleptic.

Administration.—Posology is essentially individual and varies according to the severity of symptoms and the patient's susceptibility.

How supplied.—Tubes of 50, bottles of 500 and 1000.

Also available in tablets of 5, 25 and 50 mg., ampoules of 2 ml. (5 mg. per ml.) and 1 ml. (25 mg.).

ANALGESICS

SOMA, Wallace Labs.

Description.—N - isopropyl - 2 - methyl - 2 - propyl - 1, 3-propanediol dicarbamate, 350 mg. tablets.

Indications.—Relieves pain and stiffness in a variety of inflammatory, traumatic and degenerative muscle and joint complaints, e.g., osteoarthritis, rheumatoid arthritis, spondylitis, lumbosacral and sacroiliac strain, sprains, whip-lash injuries, intervertebral disc syndrome, bursitis, etc.

Administration.—Usual adult dose: one tablet 3 times daily and at bedtime.

How supplied.—50.

Oxymorphone: NUMORPHAN Hydrochloride (N), Endo

Description.—Brand of oxymorphone, analgesic with rapid onset and prolonged action; respiratory depression, nausea and constipation are reported as occurring seldom.

Indications.—Acute and chronic severe pain, e.g., preoperatively and postoperatively, obstetrics, trauma, cancer, renal and biliary colic, etc.

Administration.—Subcutaneously and intramuscularly: average adult dose 1 c.c. (1.5 mg.) every six hours. Rectal: 2 to 5 mg. every six hours.

How supplied.—10 c.c. vials, 1.5 mg. per c.c., boxes of 3. 1 c.c. and 2 c.c. ampoules, 1.5 mg. per c.c., boxes of 12 and 100. Suppositories 2 mg. and 5 mg., boxes of 6.

DIURETICS

Hydrochlorothiazide: ORETIC, Abbott

Description.—Hydrochlorothiazide, 25 mg. and 50 mg. tablets, saluretic agent.

Indications.—Œdema due to congestive heart failure, nephrosis, liver disorders, pregnancy, etc. In hypertension, potentiates action of other antihypertensive agents.

Administration.—Œdema, 50 mg. to 100 mg. once or twice daily.

Hypertension, 25 mg. to 50 mg. once or twice daily.

How supplied.—100 and 1000.

ANTIMICROBIALS

Sulfaphenazol: ORISUL SUSPENSION (Pr), Ciba

Description.—10% aqueous dispersion with a cherry-mint flavour. Each teaspoonful (5 ml.) contains 0.5 g. of Orisul.

Indications.—For pædiatric use in systemic, enteric, biliary and urinary tract infections when due to sulfonamide-susceptible organism. May also be used in conjunction with antibiotics.

Administration.—Dosage is convenient and accurate with the calibrated dropper and spillproof bottle. The dropper is clearly marked in ¼ and ½ teaspoonfuls.

Average doses for children are as follows: Initially (for first 2 days): under 2 years: 0.25 g. (½ teaspoon) a.m. and p.m. 2-6 years: 0.5 g. (1 teaspoon) a.m. and p.m. Over 6 years: 0.75 g. (1½ teaspoon) a.m. and p.m. For maintenance: After two days, halve above dosage. Initial dosage is calculated on the basis of 0.03-0.05 g. per kg. per day (¼ grain per lb. per day), divided into 2 doses.

How supplied.—Spillproof bottles of 50 ml., with calibrated dropper.

GANGLION-BLOCKING AGENT

Trimethidinium: OSTENSIN Tablets, Wyeth

Description.—Trimethidinium methosulfate, long-acting ganglion-blocking agent, tablets of 20 mg. and 40 mg.

Indications.—For treatment of diastolic hypertension, mild or moderate cases, as well as in the management of moderately severe to severe grades of hypertension.

Administration.—Dosage must be individualized. Initially one 20-mg. tablet before breakfast and before the evening meal. If three daily doses are required, they should be at eight-hour intervals. Dosage should be increased in increments of 20 mg. every third day until a satisfactory response is obtained. Most patients require approximately 120 mg. daily in three divided doses. For maximum effect, should be taken in a fasting or near fasting state.

How supplied.—100.

ANTIBIOTICS

Griseofulvin: FULVICIN Tablets (Pr), Schering

Description.—Each tablet contains 250 mg. of griseofulvin, an antifungal antibiotic orally effective against ringworm of the scalp, beard, body, hands, feet, fingernails and toenails.

How supplied.—30 and 100.

Griseofulvin: GRIFULVIN (Pr), McNeil

Description.—Each aquamarine, scored tablet contains: griseofulvin 250 mg., oral antifungal agent.

Indications.—For oral use in treatment of ringworm of the scalp, body or nails, athlete's foot.

Administration.—Adults, usual dose is four tablets (1 g.) daily. Children, 30 to 50 lb.: one to two tablets daily; over 50 lb.: two to four tablets daily.

How supplied.—16 and 100.

Benz. Penicillin-G: MAGACILLAN 250 (Pædiatric), (Pr), Frosst

Description.—Each 5 c.c. teaspoonful contains Benzathine Penicillin-G 250,000 c.c. international units.

Indications.—For the treatment of infections caused by organisms sensitive to penicillin including staphylococcal, streptococcal, pneumococcal, and gonococcal infections; for the prevention of secondary infection in influenza, measles, whooping cough, etc., and for prophylaxis following an attack of acute rheumatic fever.

Administration.—Children 2 to 6 years of age, ½ teaspoonful 3 or 4 times daily; older children and adults, one teaspoonful 3 or 4 times daily, as the severity of the infection indicates.

How supplied.—60 c.c.

Erythromycin: ILOSONE LAURYL SULFATE 125, for Oral Suspension (Pr), Lilly

Description.—Each package consists of a bottle containing 1 g. erythromycin base (as the propionyl erythromycin ester lauryl sulfate) in a dry, flavoured mixture. At the time of dispensing, 32 c.c. of water is added to produce 40 c.c. of an oral suspension. When mixed, each 5 c.c. (approximately 1 teaspoonful) will contain 125 mg. erythromycin base (as the propionyl erythromycin ester lauryl sulfate).

Indications.—In a wide range of common bacterial infections.

Administration.—Children—10 to 25 lb., 5 mg. per lb. of body weight every six hours; 25 to 50 lb., 1 teaspoonful every six hours; over 50 lb., 2 teaspoonfuls every six hours. Adults—2 teaspoonfuls every six hours. In more severe infections, these dosages may be doubled.

How supplied.—40 c.c.

(To be continued)

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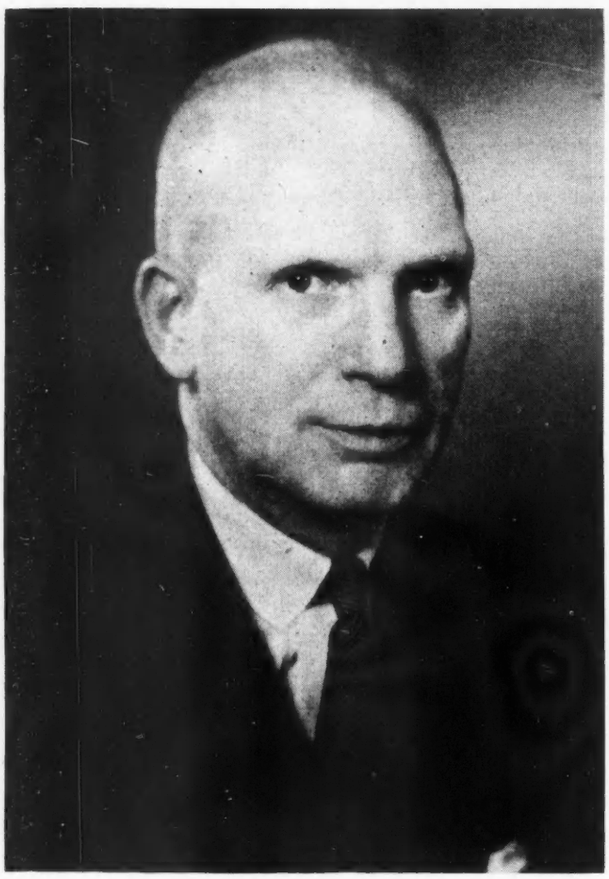
Come to Banff in June . . .

The 93rd Annual Meeting of the Canadian Medical Association will be held in Banff from June 13 to 17, 1960.

It will of course be hard to match the kindness and hospitality of our Edinburgh hosts. We hope that our President, His Royal Highness The Prince Philip, will be able to attend, but, in any case, his Deputy, Dr. Kirk Lyon, will be on hand and we are looking forward to a happy and successful meeting in the beautiful setting of the Banff Springs Hotel. Working out of Calgary, the Committees on Arrangements have already arranged a well-balanced scientific and social program. There will be an outstanding group of participants, and among the features will be a panel discussion on physical fitness, and an afternoon and evening session on the business of medicine. The Calgary Medical Society is planning a real Calgary barbecue. As usual, General Council will meet on Monday and Tuesday, and the General Sessions will be held on Wednesday, Thursday and Friday, with the annual meeting on Wednesday evening and golf on Friday afternoon. The complete program will soon be announced. There will be a number of diversions and alternatives.

You are cordially invited to Banff for this meeting. It is suggested that you make your reservations as soon as possible.

R. M. PARSONS, M.D.,
President-Elect.



DR. R. M. PARSONS

. . . And Bring Your Lady

The ladies of the Alberta Division of the Canadian Medical Association are looking forward with pleasure to entertaining you at the 93rd Annual Meeting at Banff Springs Hotel, June 13 to June 17, 1960.

The Ladies' Executive Committee of Calgary has arranged an excellent program, and coffee will be served in the registration area, where you will meet old friends and make new ones.

A trip to the new gondola lift up Sulphur Mountain will be a new experience and the view from the top is superb (camera fans, please note).

MRS. R. M. PARSONS

The ladies' luncheon at the Chateau Lake Louise will feature hilarious entertainment by a group of talented wives from Edmonton.

A farewell brunch at the Banff Springs Hotel will bring to a close an all too brief visit.

Although new motels, hotels and more and better highways have added much in the past ten years to this famous mountain resort, they have not changed her charming personality.

A variety of facilities from tennis, boating, and swimming in hot or cold pools to mountain climbing and horseback riding provide activity for everyone of all ages. The golfer may mingle with deer and other wildlife on the famous Banff Springs golf course. For those who just want to sit and relax, luxurious lounges and terraces overlook a breath-taking stretch of the Bow Valley.

(Continued on page 101)

HOUSING APPLICATION FORM

93rd Annual Meeting, C.M.A.
Banff, June 13 - 17, 1960

Dr. P. G. Costigan,
Chairman, Committee on Housing, C.M.A.,
Box 1080, Banff, Alberta.

Please reserve the following accommodation:

.....Double room (bath or shower) Twin beds..... Double bed.....

.....Room for.....person(s) (bath or shower)

.....Motel Unit for.....person(s) (bath or shower)

In view of the large attendance expected, the hotels have few, if any, single rooms available. It might be to your advantage to share a room with another member. Please mention below the name of the person with whom you would like to share your accommodation; otherwise assignment will be made by the Housing Committee.

Names of persons who will occupy the accommodation requested above:
(Kindly print names and addresses.)

NAMES (Dr. and Mrs.).....ADDRESS(ES).....

.....

I (we) will arrive in Banff on June.....at..... a.m. p.m.

I (we) will depart from Banff on June.....at..... a.m. p.m.

Travelling by: Automobile..... Train..... Bus.....

Please name accommodation desired and check choice*:

	First	Second	Third
Hotel:	.....	.....	.....
Motel:	.....	.....	.....

NAME.....

ADDRESS.....

.....

TELEPHONE No.....

*A list of hotels and motels is shown on the following page with daily rates.

N.B.: Confirmation of housing will be made direct from hotel or motel.

THIS WILL CONSTITUTE YOUR ADVANCE REGISTRATION FOR THE MEETING.

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HOTELS AND MOTELS AVAILABLE FOR ANNUAL MEETING, BANFF, ALBERTA, JUNE 13 - 17, 1960

Daily rates

ALPINE MOTEL

Two-room units, two double beds, shower baths, kitchens—four persons	$14.00
Three-room unit, three double beds, shower bath, kitchen—six persons	18.00
Two-room units with twin beds, shower baths—four persons	14.00
One-room unit with double bed, tub bath—two persons	10.00

ARROW HOTEL

Double bed and shower bath	$10.00
Twin beds and tub bath	12.00
Suites—consisting of two twin-bedded rooms and tub bath	20.00

BANFF SCHOOL OF FINE ARTS

Administration Bldg.—Twin bedroom with bath—per person	$ 5.00
Chalets—Twin bedroom with bath—per person	4.00

BANFF SPRINGS HOTEL

Per person in single room daily including meals	$20.00
Per person (two in a room) daily including meals	17.00
Per person (three in a room) daily including meals	16.50
Per person (four in a room) daily including meals	15.50
Per person (five in a room) daily including meals	15.00
Suite rates on American Plan. An additional charge is made for the parlour and the regular American Plan rate applies to the bedrooms.	
Suites—two bedrooms and parlour—Parlours are daily additional	35.00
and daily additional	30.00
Suites—one bedroom and parlour—Parlours are daily additional	30.00
and daily additional	25.00

BECKER'S BUNGALOWS

Each bungalow contains individual log fireplace, shower bath and kitchenette	
Double bed—bungalow	$10.00
Twin beds—bungalow	12.00
Two double beds—bungalow	14.00

BEL-PLAZA MOTEL

Double bed and bath—2 persons, per day	$ 9.00
Double bed and bath—2 persons, per day	10.00
Twin beds and bath—2 persons, per day	11.00
Two bedrooms and bath, 4 persons, per day	12.00
Two bedrooms and bath, 4 persons, per day	14.00
2-bedroom and sitting room and bath, per day	16.00
Double bedroom and twin-bed sitting, per day	17.00
Two bedrooms, living room and kitchenette and bath—6 persons, per day	18.00
Double bed and bath	11.00
Twin bed and bath	12.00
(Each additional person)	1.50

BREWSTER MOTEL

Two double beds, dressing room and bath—two persons	$12.00

Daily rates

CASCADE HOTEL

Twin-bedded rooms with private toilet and basin.
Twin-bedded rooms with private toilet and basin and TV.
Double or twin-bedded rooms with private bath.

KING EDWARD HOTEL

Twin-bedded rooms with private bath.
Double-bedded rooms with private bath.
Twin-bedded rooms with washbasin only.
Double-bedded rooms with washbasin only.

CHARLTON'S CEDAR COURT

Cabins with two double beds in separate rooms with no cooking—showers—per night	$12.00
Cabins with two double beds in separate rooms and cooking. Some with shower and some with bath—per night	12.00
Cabins with twin beds in the bedroom and a double bed in the living room—cooking, shower	14.00
Cabins with a double bed in the bedroom and Duo-bed in the living room, cooking, some with shower and some with bath	14.00

THE HOMESTEAD MOTEL

Singles with bath	$7-$ 8.00
Twin-bedded rooms	$9-$10.00

THE GAMMON MOTEL

Twin-bedded rooms each with combination bath and shower	$12.00

MOUNT ROYAL MOTEL

Twin beds with bath	$13.00
Double with bath	13.00
Twin with bath	8.50
Twin with bath	13.00
Double with bath	10.00
Suite—connecting bath—4 persons	16.00
Suite—connecting bath—4 persons	17.00

KEN-RIC MOTEL LTD. (Gehman's)

Double beds and private bathroom, per day	$ 7.00
Twin beds and private bathroom, per day	8.00

RAINBOW CHALETS

SCRATCH'S BUNGALOWS

TIMBERLINE HOTEL

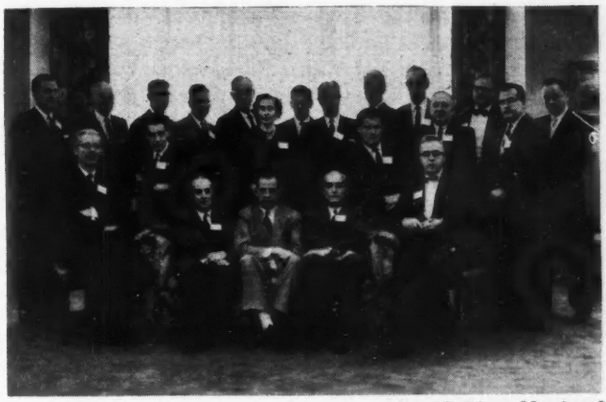
Large bedsitting rooms—some 4 persons each—private bath and/or shower.
Two-room suite, private bath and/or shower.
Twin-bedded rooms—private bath and/or shower.

(Continued from page 98)

Good shops and the new Indian Museum built on the river bank behind its own stockade are well worth a visit. The Banff School of Fine Arts, with its new administration building and chalets in their majestic setting, will interest many.

Although the days in Banff may be hot, the nights are quite cool and you would be wise to include a warm coat, sweaters and walking shoes in your equipment.

Many side trips can be made with ease. We will be happy to welcome you to Banff. HELEN PARSONS



David Bier, Montreal

Delegates who attended the Canadian Medical Association's Public Relations Workshop in Montreal, November 6 and 7, 1959, are shown assembled in the Lounge of the Nurses' Residence of the Montreal General Hospital. Representatives included members of the C.M.A. Committee on Public Relations (Nucleus) and all Divisional PR chairmen, with the exception of the Saskatchewan Division. Standing (left to right): Dr. T. Hale, PR Chairman, Quebec; Mr. K. C. Cross, Assistant Secretary, PR, C.M.A., Toronto; Dr. E. Poulsen, Alberta; Dr. H. E. Bowles, Representative, Manitoba; Mr. D. Baird, PRO, British Columbia; Miss P. Barbour, PR Department, C.M.A., Toronto; Dr. D. Kinnear, Honorary Secretary, Quebec; Dr. R. Dufresne, Member of PR Nucleus, Assistant Dean of Medicine, Faculty of Medicine, University of Montreal; Dr. J. B. Lunam, PR Chairman, British Columbia; Dr. J. G. Williams, Representative, Newfoundland; Mr. J. M. Denault, Director of Public Relations, Quebec; Dr. T. Currier, PR Chairman, Ontario; Mr. Basil McLaughlin, Assistant Secretary, PR, Ontario; Dr. B. L. Jewett, PR Chairman, New Brunswick. Seated (left to right): Dr. J. Kettlewell, Assistant Secretary, Alberta; Dr. R. H. McFarlane, PR Chairman, Manitoba; Dr. S. LeBlond, President, Quebec Division; Dr. E. F. Crutchlow, Chairman, C.M.A. PR Committee (Nucleus), Quebec; Dr. M. T. Macfarland, Executive Director, Manitoba; Dr. I. MacMillan, Representative, Prince Edward Island; Dr. F. Dunsworth, PR Chairman, Nova Scotia. Absent when photograph was taken: Dr. A. D. Kelly, General Secretary, C.M.A., Toronto; Dr. W. Storrar, Member of PR Nucleus, Medical Director of the Montreal General Hosptal; Dr. G. Halpenny, Member of PR Nucleus, Montreal.

Association Notes

PUBLIC RELATIONS WORKSHOP

On November 6 and 7, 1959, a Public Relations Workshop was held in the board room of the Montreal General Hospital, with representation from the nucleus and from all divisional PR committees with the exception of Saskatchewan. The meeting was called to order by the Chairman, Dr. E. F. Crutchlow.

Divisional Question Period

Dr. Roger Dufresne took the chair for the divisional question period. The *British Columbia Division* reported that they had conducted an extensive opinion survey last year among the public and medical profession of the province. The results indicated that good relations existed with the public generally, but that further education of the public on the implication of socialized medicine was desirable. The medical profession had become a better informed group as a result of the President's letter, the *British Columbia Medical Journal* and visits to district societies by members of the Executive.

Commenting on the survey, Dr. Crutchlow suggested that the opinions of potential doctors also be obtained. It was recommended that lines of communication between final-year medical students and interns be kept open by closer liaison with CAMSI.

The *Alberta Division* reported that they were stressing the triple P in PR—press, public and profession. When the subject of the over-all reaction to the showing of the three recent C.M.A. TV filmettes came up later in the meeting, this division drew attention to their resolution that this phase of the public relations program be reassessed. They felt that the effect of these filmettes was to degrade rather than enhance the status of the medical profession. Discussion ensued, and differing opinions were expressed on the value of these filmettes. It was decided that an opinion poll among the profession for their comments be conducted six months following each series.

An interesting item in the program of the *Manitoba Division* was that they had employed a part-time PR consultant to increase medical news coverage, to write feature articles and to provide a more favourable background against which public opinion might be formed.

The pros and cons of conciliation or mediation committees were discussed at length. The general secretary of the C.M.A. commented that the mediation committee offered a practical method for dealing with protests, and should not be dismissed. It was felt that a better impression would be created among the public if it were known that such committees existed to consider problems.

A report was then made on an effective PR project carried out on "Glaucoma Day" by the division's section on ophthalmology in co-operation with the Winnipeg Medical Society and sponsored by the Lions Club. A television program was arranged which showed the method of measuring intraocular tension and explained the nature of the disease. Subsequently, a clinic was set up in a downtown department store where any passer-by could have his ocular tension determined. Several thousand people availed themselves of this opportunity and some eighty new and asymptomatic cases were brought to light.

The chairman for the *Ontario Division* stated at the outset that one of their important recent PR assignments had been to prepare a list of suggested revisions of the existing O.M.A. Statement of Policy. This division also distributed 25,000 copies of the brochure, "Information for Patients", which was designed to promote better understanding between doctor and patient. They established a Speaker's Bureau which it was hoped would be in operation early in the new year. Its purpose is to provide speakers on short notice to address service clubs and other groups on various topics of medical interest.

The medical exposition, "Mediscope '59", was considered the major PR project for this division. It was the answer of the O.M.A. to repeated requests from the public for more information about the workings of the

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human body and the diseases and injuries that affect our daily lives. The attendance was in excess of 160,000. The support given by over 1200 doctors who manned the booths on a roster system was one of the encouraging highlights of the exposition. In order to increase the interest of secondary school students in medicine, arrangements were made with the Department of Education for schoolchildren attendance. In addition, two of the top science students from every high school in the province were invited to Mediscope, and billeted with doctors who escorted them to the exposition.

The *Nova Scotia Division* stated that their greatest need was for adequate liaison with public information media. Also, they have held discussions to decide the best way to strengthen internal communications within the profession; the possibility of a newsletter had been discussed.

Because of its size (90 doctors), the *Prince Edward Island Division* was able to report that intraprofessional communication was no problem. Relations with the government, public and press were good.

The chairman of the *New Brunswick Division* stated that their main project was that of trying to educate the profession not to make irresponsible statements. The press designated good reporters for medical coverage; the division supplied background material; newspaper owners were co-operative; and results were most favourable.

Reporting for the *Newfoundland Division*, Dr. Williams stated that their Division was still young and that a lack of cohesion existed within the profession itself. He later posed the question, "How does one find out about schemes affecting doctors before they are actually carried out by Government?"

The main project for the year in the *Quebec Division* had been an hour-long TV program explaining the workings of a modern hospital. In the field of internal relations, strong efforts had resulted in a notable increase in membership.

Fluoridation

Dr. Poulsen stated that the Alberta Division felt that more education of the public should be carried on in such matters as fluoridation, as people often vote on issues about which they know very little. Public opinion was often swayed by one persuasive orator against the considered opinion of 800 doctors. Dr. A. D. Kelly replied that the C.M.A. was on record as approving fluoridation, that the matter was now in the hands of the Committee on Public Health, and that possibly a more active push was in order. It was also agreed that the profession should be better informed on issues such as fluoridation and H3, in order to answer queries from the public.

A Closer Ear to Ottawa

One of the members expressed concern over the complacency of the profession in the matter of public relations, and felt that the C.M.A. should have a closer knowledge of what goes on in Ottawa. Dr. Kelly replied that liaison was being maintained with the Minister of Health and Welfare, and with doctor-members of both House and Senate. He mentioned the role of the Advisory Committee to the Federal Government and added that government doors had never been closed to the C.M.A. Another member expressed the opinion that someone who was not a member of the C.M.A. might gain more confidence and be of greater value. The discussion closed with the comment that provincial government liaison was equally important.

Fees and Mediation

Dr. Crutchlow asked how long a minority group of doctors charging unreasonable fees would be permitted to continue to nullify the work of other doctors and PR bodies across the country. Concern was expressed that disciplinary committees and committees on ethics had no legal powers of prosecution. Dr. Kelly noted that mediation committees and call-answering services were evidences of the profession's desire to correct legitimate complaints. He hoped that a multitude of local committees of this nature would be formed. The mechanics of it would be simple: let the public know that it exists; have complaints submitted in writing; give the doctor an opportunity to answer the complaint; and then meet to take action. The moral persuasive power of such a committee should not be underestimated. It was felt that instances of a committee-member's being called to testify in court against a fellow practitioner in the wrong would occur infrequently.

Should adverse comments be publicly refuted by the medical profession?

It was agreed that each case should be examined on its own merits. The situation in Saskatchewan was mentioned where both political parties are advocating state medicine as a part of their platform for the forthcoming election without first considering the opinion of the medical profession of that province. The doctors decided at their annual meeting to issue a positive statement from the profession in this regard, but not one directed at refuting adverse statements.

Employment of Public Relations Counsel

In the main, it was thought that the C.M.A. should avail itself of public relations counsel. However, one member suggested that "business consultant" was a better term for the type of counsel needed. Dr. Kelly agreed that, as well as having a PR Secretariat, a PR consultant could be brought in for a specific purpose, and added that it would be useful to have a management consultant take a look at an organization as large as the C.M.A.

C.M.A. Information Bulletin

Mr. Cross reported that in March 1959, the first C.M.A. Information Bulletin was circulated and was well received. The title and subject of the proposed second bulletin will be left for the PR Nucleus Committee to decide.

Medical Recruitment Program

In a progress report on medical recruitment, Mr. Cross said that this subject had been a constant item on the C.M.A. Public Relations Committee program. As a result of their deliberations and in co-operation with the deans of Canadian schools of medicine, 12,500 copies of a 12-page booklet, *"Doctors of To-morrow"*, were printed. Twenty to 40 copies will be sent to all secondary schools in Canada. The over-all success of the complete medical career program will depend on the support of divisional and medical societies. A mimeographed course of action for stimulating student interest in medicine is available.

Discussion of Two Films

The A.M.A. film, "I Am A Doctor", was felt to be an excellent technical production, but certain features of emotional appeal raised some doubt as to its suitability for medical recruitment.

The B.M.A. documentary film, "On Call To A Nation", received unanimous approval for its structure and content and was felt to be excellent for showing to both professional and non-medical audiences.

In his remarks at the conclusion of the meeting, Dr. Crutchlow announced that a national Public Relations Committee meeting will take place in Toronto in March 1960. The meeting will include representatives from the nucleus, divisional PR chairmen, divisional secretaries and public relations consultants.

On Friday evening, November 6, the members of the PR Workshop joined with representatives of the Montreal news media for a dinner at the St. Denis Club, Montreal. The chairman, Dr. Crutchlow, welcomed the newsmen and introduced Mr. Champoux (*La Presse, Montreal*), who opened the discussion by directing four questions at the medical profession, and in particular to Dr. Kelly, who was asked to reply.

'Why are you so dignified? Because you are doctors?" Dr. Kelly replied that he did not feel that doctors appeared to be more dignified because they were doctors; dignity was simply one of the qualities to which doctors aspire.

"Why are you so nervous when approached by news media?" The possibility of being misquoted was given as the reply.

"Why do you delay news?" News is often delayed because next-of-kin have first to be notified.

"Why are you so subtle when describing the illness of a VIP?" Firstly, the doctor's concern is the care of the patient; secondly, patients have a right to privacy; and thirdly, statements made to the press are best described as reserved, rather than subtle, and are made in order to prevent the news media from conjecturing erroneously from any silence.

Before answering these questions, Dr. Kelly stated that his answering did not necessarily indicate that the implication of the question was regarded as valid.

Several doctors expressed the opinion that information about such topics as the uses of H3 for rejuvenating life should first appear in medical journals rather than in general lay publications, and that the profession should have the answers to questions asked by the public on these subjects.

THE CANADIAN MEDICAL RETIREMENT SAVINGS PLAN

Contributions to C.M.R.S.P. during the third quarter of 1959 totalled $424,000. Of this amount, $141,000 was allocated to the insured annuity fund and $283,000 was allocated to the common stock fund.

On a cumulative basis, contributions to C.M.R.S.P. since its inception total $5,353,000. Of this amount, $1,940,000 (or 36%) has been allocated to the Insured Fund and $3,410,000 (or 64%) allocated to the Common Stock Fund.

The Common Stock Fund

On November 30, 1959, the value of each unit in the common stock fund was $12.58, a 3.2% decrease from the $13.00 valuation on August 31. This decrease was due to a broad drop in the values of common stocks which started in the latter part of August and reached its lowest level about mid-September. This reaction indicates that stock prices can fall substantially within a relatively short time. During the remainder of the quarterly period, prices fluctuated irregularly within a relatively narrow range.

During the last quarter, common stocks of 29 companies were purchased. All were additional purchases of stocks previously held in our portfolio. In addition, we invested $25,000 in Simpsons Limited 5½% Convertible Debentures. While our fund is primarily set up for common stock investment, this position was taken to secure additional income and at the same time be able to take advantage of the favourable convertible privileges of this issue.

COMMON STOCK FUND

VALUATION OF ASSETS AT NOVEMBER 30, 1959
(U.S. STOCKS VALUED AT EQUIVALENT CANADIAN PRICE)

	Fixed Income	*Nov. 30, 1959 Value*
$25,000	Simpsons Ltd. 5½% Conv. Debs.	$27, 875.00

COMMON STOCK

No. of Shares	*Description*	*Nov. 30, 1959 Value*
	Automotive:	
250	Ford Motor Co. of Canada Class 'A'	$ 41,000.00
1000	General Motors	49,660.00
	Banks:	
2500	Bank of Montreal	135,000.00
1600	Banque Canadienne Nationale	83,200.00
2000	Canadian Bank of Commerce	111,500.00
1550	Royal Bank of Canada	121,287.50
1400	Toronto-Dominion Bank	79,800.00
	Beverages:	
1500	Hiram Walker Gooderham & Worts	57,375.00
1800	Canadian Breweries Limited	64,125.00
2700	Molson's Brewery Class A	65,475.00
	Building Products:	
1000	Building Products Limited	31,000.00
1750	Canada Cement	58,625.00
2300	Dominion Tar & Chemical	35,075.00
	Chemicals:	
1500	Canadian Industries Limited	23,250.00
1019½	Dow Chemical	91,255.45
350	E. I. Dupont de Nemours	84,679.00
	Electrical:	
500	Canadian Westinghouse	20,250.00
1375	General Electric	119,652.50
	Insurance:	
360	Confederation Life Assn.	58,320.00
180	Manufacturers Life Insurance Co.	44,640.00
450	Insurance Co. of North America	53,316.00
	Iron and Steel:	
1700	Algoma Steel Corp.	63,112.50
1100	Steel Co. of Canada Ltd.	92,400.00
	Merchandising:	
2400	Loblaw Companies 'A'	59,700.00
2700	Simpsons Limited	90,450.00
2500	Woodward Stores 'A' Limited	49,375,00

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	Metals:	
1050	Asbestos Corporation	27,562.50
1200	Aluminium Limited	36,000.00
1800	Hollinger Consolidated Gold Mines Limited	48,150.00
600	International Nickel	59,475.00
1200	Consolidated Mining and Smelting	23,700.00
	Miscellaneous:	
375	International Business Machines Co.	155,276.25
3000	Moore Corporation	122,250.00
750	Owens Illinois Glass	71,227.50
250	Goodyear Tire and Rubber Co. of Canada	45,375.00
250	Minneapolis-Honeywell Regulator Co.	31,992.50
1000	Page Hersey Tubes	28,875.00
	Petroleum:	
1500	British American Oil	47,625.00
1100	Imperial Oil Limited	37,950.00
650	Texaco Canada Limited	34,775.00
1300	Standard Oil of New Jersey	58,487.00
1300	Hudson Bay Oil and Gas	14,625.00
	Pulp and Paper:	
1500	Consolidated Paper	61,125.00
1100	Great Lakes Paper	44,275.00
1000	Howard Smith	41,000.00
3200	Powell River Company	54,800.00
1500	St. Lawrence Corp. Limited	26,812.50
	Pipelines:	
1300	Interprovincial Pipe Line	74,100.00
1300	Trans Canada Pipe Lines Limited	33,312.50
1100	Alberta Gas Trunk Line	29,700.00
	Public Utilities: Electric	
4000	Calgary Power	72,500.00
3500	Shawinigan Water and Power	98,000.00
600	British Columbia Power Company	21,375.00
	Gas Distribution:	
2500	Consumers Gas Company	95,625.00
2500 Rts.	Consumers Gas Company	2,300.00
4400	Union Gas Company of Canada	71,500.00
	Telephone:	
1750	Bell Telephone Company of Canada	74,156.25
	TOTAL INVESTMENTS	$3,455,324.95

Market Valuation of Fund and Unit

Market Value of Investments	$3,455,324.95
Add:	
Accrued Income— (Dividends declared but unpaid)	10,807.99
Cash on Deposit—at interest	1,079.86
	$3,467,212.80
Less:	
Outstanding payments re: Purchase 50 Shares. Hiram Walker Gooderham & Worts	1,967.50
	$3,465,245.30
Less:	
Administration Fee (1/8 of 1% of above)	4,331.56
Market Value of Fund as at November 30, 1959	$3,460,913.74

Units outstanding—275,103.264
Market Value per Unit—12.58

On the basis of 275,103.264 outstanding units, the unit value was $12.58. Contributions made to the common stock fund during the three months prior to November 10 purchased units at this rate.

Notice to Non-Participants

If you wish to obtain more information about C.M.R.S.P. please write to the Association office at 150 St. George Street, Toronto 5. Brochures and other informative literature are available on request. The basic outline of C.M.R.S.P. is simple and extremely flexible, and participation will enable you to obtain tax relief now on savings which you invest to provide retirement income.

MEDICAL MEETINGS

CANADA'S EMERGENCY HEALTH SERVICES

At last some rays of light appear to be penetrating the fog of confusion and frustration which has been associated in the minds of many doctors with the words "civil defence". A National Conference on Emergency Health Services was held November 16-18, 1959, at the Canadian Civil Defence College, Arnprior, and the discussions there, before a large and representative attendance, have provided much needed illumination.

The ultimate national emergency which is envisaged as a possibility is a thermonuclear attack on one or more targets in Canada. Blast, heat and ionizing radiation have terrifying casualty-producing powers only greater than the sequelæ of traumatic injury, fire and radioactive fallout which inevitably occur. The magnitude of the problem of handling casualties in thousands or even hundreds of thousands is in it itself frightening but this does not constitute a reason why plans should not be made to accomplish the maximum in human salvage.

It is now recognized that war in this atomic age will not be waged in the first instances by raising forces for duty abroad. Indeed national survival will demand the concerted efforts of all citizens to withstand the devastation of thermonuclear attack on this country. In this effort the Armed Forces, Regular and Reserve, have been assigned as usual to the front line. The elements of the Canadian Forces Medical Service will support military forces who are first to enter the area of attack to conduct rescue operations and provide limited first aid. These elements of the Canadian Forces Medical Service will sort casualties and provide primary treatment. In the military area officers of the Canadian Forces Medical Service will control and direct medical procedures but they will require civilian assistance. Casualties will be decontaminated under medical supervision, but treatment will not be delayed on this account. The Canadian Army has also been assigned the task of operating a warning network, a monitoring system to locate and define areas of dangerous fallout, and of rendering assistance to the civil authority in such essential services as firefighting and policing.

It was emphasized by all speakers who addressed the conference that this new function of the Armed Forces does not mean that any slackening in civilian effort is possible, but rather that it should be more adequately planned and co-ordinated with the military operation.

The conference was informed of the establishment at the highest level of government of the Emergency Measures Organization. Originally designed to plan

measures to insure the continuance of civil government and national economic capacity under catastrophic conditions, E.M.O. now serves in addition to coordinate the efforts of all federal government departments with assigned tasks in civil defence and to provide by regional officers liaison with the provinces in all phases of their emergency planning activities.

After a day profitably spent in orientation by well-informed representatives of the key departments of government, it was possible for those in attendance at this conference to see the relationship of the stupendous medical problems to equally important activities of other disciplines in the context of national survival. It logically followed that the attention of the conference should then be focused on our prime area of interest, health and medical care.This was accomplished by a panel under the chairmanship of Dr. K. C. Charron. The discussants were in each instance section heads in the Emergency Health Services Division of the Department of National Health and Welfare. Dr. F. C. Pace discussed the health aspects of special weapons, a phrase used to encompass the radiation aspects of nuclear weapons, and chemical and biological warfare, as well as the training of physicians, dentists and veterinarians in relation to these devices. Dr. E. J. Young presented the public health problems resulting from mass destruction and the movement of populations, while Dr. G. E. Fryer discussed planning by and for hospitals to permit them to handle large numbers of casualties as well as the arrangements for first aid and initial treatment in advanced units. Miss E. A. Pepper discussed the emergency blood and transfusion services and described the substantial progress which has been made in nurse training and mobilization under emergent conditions. Dr. H. R. McLaren, the dental adviser, presented the proposition that casualities in the numbers envisaged were likely to be beyond the capacity of purely medical personnel and described the aid which is being planned by the allied professions of dentistry, pharmacy and veterinary medicine. Mr. J. E. Matthews, Phm.B., health supplies officer, described the progress being made in the procurement, distribution and stockpiling of essential emergency supplies, and the members of the conference had the opportunity of viewing an extensive exhibit of matériel. The final presentation in this panel was made by Dr. E. J. Young on the organization, staffing and financing of central and peripheral organizations for emergency health services.

This able presentation of the ramifications of the Emergency Health Services provided convincing evidence of much thought and considerable accomplishment in an area fraught with difficulties and uncertainties. It also conveyed a measure of reassurance that at least our central planners have been hard at work.

The conference then divided itself into six syndicates where a series of questions was debated and subsequently reported to the whole group by syndicate chairmen. A concurrent meeting of the Defence Medical and Dental Services Advisory Board was held.

Running like a thread through the discussions of the conference and its syndicates, and clearly reflected in the proceedings of what may be the final meeting of the Defence Medical and Dental Services Advisory Board, was the concept that the immediate need in emergency health planning is representative provincial organizations. Under the auspices of provincial departments of health it is to be hoped that a nucleus of full-time officials will be aided by active representation of the voluntary organizations of medicine, nursing, dentistry, pharmacy, veterinary medicine and hospitals, together with the regional representative of the Canadian Forces Medical Service.

Stated in this fashion, it does not appear that the proposed organization is either novel or earth-shaking in its structure. It does, however, represent an advance in thinking which may well serve to reactivate the interest of well-disposed organizations of the health professions and keep them in touch with planning as it matures. It may further provide the pattern for municipal organizations which will serve to answer the question in the minds of many doctors, "What do I do when the siren blows?"

The delineation of the complex problems involved in the medical aspects of disaster planning was most helpful to those who participated in the conference. From the viewpoint of the organized medical profession, it was encouraging to note the presence of five Divisional Secretaries as well as the C.M.A. representatives to DMDSAB and a representative group of physicians who are concerned with emergency arrangements in either official or individual capacities.

A. D. KELLY, M.B.

LETTERS TO THE EDITOR

MERALGIA PARÆSTHETICA

To the Editor:

Dr. W. R. Ghent's article on meralgia paræsthetica (*Canad. M. A. J.*, 81: 631, 1959) draws attention to the scarcity of reports of this condition. For this reason I record here a case with which I was personally associated and would also like to refer to another anatomical work.

A 25-year-old white female of 146 lb. and 67 in. tall, during her first pregnancy, commenced from the fifth month to experience "pins and needles" over the right thigh in the distribution of the lateral cutaneous nerve of thigh; meralgia paræsthetica was diagnosed and no treatment given. For the rest of the pregnancy until delivery the paræsthesiæ continued and became more distressing with subjective tingling and feeling of heaviness in that part of the upper leg. Objectively there was some mild anæsthesia in the same distribution; there was no distinguishable change in appearance. No position could be found which would give relief from the symptoms. However, they appeared to be less severe on rising in the morning. A normal full-term female child of 7 lb. 3 oz. was delivered spontaneously after a normal labour; no further symptoms were experienced from that time, suggesting that the pelvic contents were the precipitating factor. An interesting feature is that two subsequent pregnancies were not accompanied by meralgia paræsthetica.

Prof. R. J. Last, professor of applied anatomy at the Royal College of Surgeons of England, in his book *"Anatomy Regional and Applied"* describes the normal lateral cutaneous nerve of thigh as lying behind the iliac fascia at first; as it approaches the inguinal ligament, it becomes incorporated in the substance of the fascia where it is a thick membrane and

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pierces the inguinal ligament, thus lying in a fibrous tunnel just medial to the anterior superior iliac spine. He mentions the possibility that meralgia paræsthetica may be associated with irritation of the nerve in this canal.

The implication is that any case of meralgia operated on as suggested by Dr. Ghent's article will indeed reveal the "anomaly" described by Prof. Aird and referred to by Dr. Ghent.

M. DUNKLEY, M.D.

4 - 2431 Portage Ave.,
Winnipeg 12, Man.,
November 14, 1959.

FLUORIDATION AND FREEDOM

To the Editor:

The exhaustive letter "Fluoridation and Freedom" in the November 1 issue of the Journal (81: 763, 1959) suggests that the concept of the profession in this matter "is a concept which appears more compatible with socialism than with the personalist democracy we purport to be"; but nowhere, in the councils of our profession or in the statements of its individual members, have I noted approval of compulsion which is inferred throughout this letter.

On the other hand, our profession has, as a responsible scientific group, endeavoured to interpret the value of fluoridation and many other health procedures to our people, who must finally make their own decision in these matters. If our interests become so insular or so indifferent to the public weal that we fail to offer such assistance, then we invite the deserved censure of those whom we purport to serve.

G. M. LITTLE, M.D.

12203 - Jasper Avenue,
Edmonton, Alberta,
November 26, 1959.

ANÆMIA IN ESKIMOS

To the Editor:

The short communication on the incidence of anæmia in infancy and early childhood among Central Arctic Eskimos[1] contains significant errors.

It is not stated in referring to Dr. Rabinowitch's report[2] that his findings were made on Eskimos who lived in more remote parts. In his words, "A very striking example of the influence of contact with civilized man is seen when the diseases met with in Hudson's Bay and Straits are compared with those of the more northerly regions of the Eastern Arctic." Speaking of two settlements, Chesterfield and Port Burwell, he says, "The majority of the natives at these posts were pale. . . ." The altered dental picture in the two groups has also been noted. Here are simple observations whose importance cannot be underestimated. Both articles mention bannock as a major "benefit" of civilization.

A recheck, then, of children in both groups might give rise to varying results and to conclusions other than that "the cause of this anæmia is not clear, but it is probably associated with ingestion of foods low or deficient in iron during the first few years of life."[1] And again, one might conceivably question the commonly accepted statement made that "Anæmia in white children . . . . is the result of a dietary deficiency [as] indicated by their response to the administration of iron."[1]

I have not specifically suggested a hypersensitivity here as a cause of the anæmia, which I believe is actually the case.

DONALD MITCHELL, M.D.

1414 Drummond St.,
Montreal, Que.,
November 23, 1959.

REFERENCES

1. SELLERS, F. J., WOOD, W. J. AND HILDES, J. A.: *Canad. M. A. J.*, 81: 656, 1959.
2. RABINOWITCH, I. M.: *Ibid.*, 34: 487, 1936.

PRACTICE WITHIN A PREPAID PLAN

To the Editor:

May I congratulate the anonymous author of "Some Observations on General Practice within a Prepaid Plan" (*Canad. M. A. J.*, 81: 740, 1959) on his excellent and most valuable presentation.

The records he discusses are not his own, but those of his colleague, whose place he took for one year in this onerous one-man general practice. The colleague kept good records which were then assessed by his locum tenens, who could be completely objective.

The main points he makes are that comprehensive prepaid care leads to an increase in the physician's income owing to certainty of payment and to a lesser extent owing to additional services demanded by the patients on prepayment. These services were not for so-called "neurotic" disease, but for earlier and more frequent treatment. The author feels that a proportion of these services were not necessary. He also concludes that publicly sponsored prepaid medical service on the fee-for-service basis would do little to disturb the present pattern of general practice in Ontario. It would also not alleviate its few unsatisfactory features, the greatest of which is overwork.

This latter statement is amply supported by our own observations (leRiche, H. and Stiver, W. B., *Canad. M. A. J.*, 81: 37, 1959) which indicate that a general practitioner working on a 2000-hour year basis could carry out about 5300 services adequately. To do close to 8400 services in the reported study would require a working year of 3200 hours, clearly excessive. Such a practitioner is too tired to undertake his normal family and community responsibilities, and he is too tired to read to keep up with advances in his craft.

We need more studies of this type and we need far more constructive thought on how physicians should be paid. Money is important, but money alone does not make up for deterioration in health and happiness.

W. HARDING LERICHE, M.D.

Department of Public Health,
School of Hygiene,
University of Toronto,
November 26, 1959.

"COMPLICATED BY SURVIVAL"

To the Editor:

In my simplicity I had always supposed that survival was the immediate goal to strive for in treating desperately ill or injured people, followed if possible by their restoration to health. Of course such an illness or injury might have complications, and as a student I can recall trying to memorize—often in vain—the complications of this or that disease.

The happy thought that survival itself could be one of the complications had not occurred to me till I read the November 15 issue of the Journal (p. 836). I now realize that when I was asked for "the complications" in a *viva voce* examination I might have gained valuable time to think by saying brightly "Well . . . . *survival*, of course. . . ."

But, Sir, the more I think about this the more I find myself sympathizing with the man from way down South who was soliloquizing about spring and who said,

" 'De little boid is on de wing'—
Gee . . . . that's absoid . . . .
I thought de wing was on de boid."

J. D. H. ILES, L.M.C.C.

Division Street,
Colborne, Ont.,
November 24, 1959.

OBITUARIES

DR. D. H. BOX, 35, died at Mississippi Lake, Ont., on October 8. He had been in poor health for some time. A graduate of the University of Toronto in 1952, Dr. Box practised for a time at Bridgeport, Ont., and then at Sioux Lookout.

He is survived by his widow.

DR. JAMES WELLINGTON CRANE, 82, died at the Elgin Hospital, St. Thomas, Ont., on November 3. He attended the University College Medical School in Toronto from 1894 to 1898, when he graduated with the degree of M.B. In 1913 Dr. Crane began to practise in London, Ont., and joined the staff of the Medical School, where he later became professor of pharmacology and gave the undergraduates lectures in the history of medicine. At one time he was president of the Historical Section of the Canadian Medical Association. From 1927 to 1929 he served as dean of the University of Western Ontario. In 1947 he received the LL.D. degree from Western in recognition of his long and unique service in the cause of medicine, and in 1948 he was given his M.D. degree from the University of Toronto to mark his completion of 50 years of medical practice. With Drs. Jabez Elliott, Paul O'Sullivan and George Porter he organized the Toronto Historical Club in 1923, which still flourishes. In London he organized an Osler club, a Harvey club, a noon-day club and several others, and these too are still flourishing. He was a father confessor to his students, and helped many with sound advice and often financial aid. Some years ago he retired to a pleasant cottage and garden at Iona Station near London. Here many of his old pupils came to visit him, often in good numbers.

His wife predeceased him by a few years.

F. ARNOLD CLARKSON

DR. W. H. JACQUES, 52, died on November 14 at his Toronto home. He was born in West Hill, Ont., and received his medical education at the University of Toronto, where he graduated in 1940. His internship was served at the Riverdale Hospital, where he eventually became acting superintendent and later medical director.

Dr. Jacques is survived by his widow and two daughters.

DR. ROBERT J. KEE, 87, died suddenly at his home in Ottawa on November 14. Born in Peel County, Ont., he attended the University of Toronto and graduated in medicine in 1901. He then went to England, where he did postgraduate work in various hospitals in the London area. In World War I Dr. Kee joined the British Army, serving first in Malta and later in France. Invalided from the army, he was posted to Ottawa as assistant medical adviser in ophthalmology and otolaryngology with the Canadian Pension Commission. In 1922 he became assistant chief medical adviser of the commission and in 1924 the chief medical adviser.

Dr. Kee is survived by his widow and a son.

DR. C. H. McCREARY, 81, died in Saskatoon on October 23. He was born in Middlepoint, Ont., and later moved with his family to Lunenburg, N.S. In 1908 he entered McGill University and graduated in medicine in 1912. After serving his internship at Englewood, N.J., he moved to Montreal and practised there until 1942. He then went to Saskatchewan, where he remained in practice until a short time before his death.

Dr. McCreary is survived by his widow and three daughters.

DR. W. T. SHIRREFF, 79, died in Ottawa Civic Hospital on November 3. A native of Fitzroy Harbour, Ont., he went to Queen's University, Kingston, and graduated in medicine in 1903. After interning at the Carleton County Protestant Hospital, he was appointed resident physician at the Isolation Hospital, Ottawa, and specialized in communicable diseases. In 1907 he started a private practice at Hazeldean, where he remained until his appointment as medical officer of health for Ottawa four years later. At the outbreak of World War I Dr. Shirreff joined the Canadian Medical Corps as a captain. On his discharge from the army at the end of the war, he was appointed head of the Isolation Hospital, a position which he held until his retirement in 1946. Dr. Shirreff also served as coroner for Ottawa and Carleton county.

He is survived by his widow and one son.

DR. J. E. TILDEN, 56, died at his home in Aldershot, Ont., on November 2. Born in Hamilton, he received his medical education at Queen's University and graduated in 1928. Dr. Tilden was formerly a city police physician in Hamilton and medical adviser for the National Steel Car Corporation. He later became resident physician at St. Joseph's Hospital, Hamilton,

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and also acted as physician for the Workmen's Compensation Board.

Dr. Tilden is survived by his widow.

DR. FREDERICK W. WALLACE, 74, was killed in Oakville, Ont., on November 5 when the car he was driving went out of control and crashed into a tree. He was born in Greenbank, Ont., and was a graduate of the University of Toronto in 1908. Dr. Wallace had practised as an ophthalmologist and ear, nose and throat specialist in Toronto, Brantford and Calgary, before moving to Oakville seven years ago.

He is survived by his widow, who was injured in the accident, and a daughter.

PROVINCIAL NEWS

NEW BRUNSWICK

The shortage of fully qualified social workers is not confined to New Brunswick. For this reason the N.B. Department of Health has sponsored an annual four-week in-service training program at the University of New Brunswick for the past two years. This course is part of the University Summer School Session and has been so successful that it will be continued in following summers.

The Health Department conducted a refresher course by the sanitary engineering division in Fredericton in late October designed to serve the four Maritime provinces. Special instructors included: Mr. C. R. Wilcox, sanitary engineer from Michigan; Dr. A. F. Chaisson and Mr. A. E. Wilby of the N.B. Department of Health; Mr. Day, Central Mortgage and Housing Corp.; Mrs. J. A. MacKiel, Laboratory of Hygiene, Ottawa; and Mr. C. C. Smith, Laboratory of Forest Biology.

Dr. L. E. Bashow, director of Forest Hill Rehabilitation Centre at Fredericton, has completed a six-week course in rehabilitation at Sunnybrook Hospital.

Dr. R. A. Gregory, medical superintendent of the Provincial Hospital at Lancaster, N.B., has recovered from a severe illness and is expected to be fit for duty in a short time.

Dr. G. B. Peat of Saint John has been re-elected president of the Boy Scout Association of New Brunswick.

Dr. A. S. Cowie has been appointed medical director of the Fredericton Polio Clinic and Health Centre, succeeding the late Dr. J. A. M. Bell. Dr. Cowie graduated from Dalhousie University M.D., C.M., in 1933, served in the R.C.A.M.C. from 1940 to 1952 and has completed an extensive postgraduate program in medical specialties.

The N.B. Chapter of the College of General Practice held its annual meeting on October 24 in the Admiral Beatty Hotel in Saint John. Dr. R. Roy Forsey of Montreal discussed fungous diseases during a clinical hour.

At the dinner meeting Dr. Murray Fraser, president-elect of the College, discussed the preceptor scheme planned in Nova Scotia, the provision by the College of six clinical days a year in Prince Edward Island by lecturers from Dalhousie Medical College at which the average attendance was 35-40 per meeting, and a proposed plan in Nova Scotia to provide relief doctors to allow physicians to attend meetings and in case of illness of doctors practising alone. Dr. W. V. Johnston, executive director of the College, was a welcome guest.

The officers elected for the year 1959-60 are: president, Dr. Percy Losier, Chatham; vice-president, Dr. Edmund D. Johnston, St. Stephen; secretary, Dr. Leonard I. Morgan, Saint John. A. S. KIRKLAND

NOVA SCOTIA

Dalhousie University presented the Thirty-third Annual Refresher Course from October 26 to 29. The arrangements were conducted under the chairmanship of Dr. H. K. Hall, and 140 doctors in all registered for this course. Only 42 were from outside the city of Halifax—a somewhat disappointing response.

The guest speakers were Dr. Milton J. E. Senn, professor of pediatrics and psychiatry, Yale University, and director of the Yale Child Study Center; Dr. Edward J. Wayne, regius professor of medicine, University of Glasgow; Dr. Bentley P. Colcock, on the surgical staff of the Lahey Clinic; Dr. R. Roy Forsey, associate professor of the department of medicine and clinical medicine of McGill University. Dr. Forsey is a dermatologist.

The John Stewart Memorial lecture was held on Wednesday, October 28. Dr. Milton Senn was the guest speaker. His subject was "Equipping our children to meet community responsibilities".

The first Atlantic Regional Meeting of the Royal College of Physicians and Surgeons of Canada was held in Halifax on Friday and Saturday, October 30 and 31. The attendance was 116 and there was a good representation from the Maritime provinces. Eighteen Maritime physicians and surgeons took part in the program.

The guest speakers from outside the Maritimes were Dr. John W. Scott, Edmonton, president of the Royal College of Physicians and Surgeons of Canada; Dr. Ian George Milne of Montreal; Dr. Bentley P. Colcock of the Lahey Clinic, Boston; Dr. Louis-Philippe Roy, Quebec; Dr. Edouard D. Gagnon, associate professor of surgery, University of Montreal; Dr. J. Clifford Richardson, assistant professor of medicine, University of Toronto; Dr. John D. Hamilton, professor of pathology, University of Toronto, Dr. Stewart R. Townsend, Montreal; Dr. Jean-Georges Couture, Quebec; and Dr. Edward Johnson Wayne, professor of medicine, University of Glasgow, and the 1959 Simms Commonwealth Travelling Professor.

The program presented was quite a varied one, and some outstanding papers were presented. The Royal College banquet, held on Friday at the Lord Nelson Hotel, was attended by the Lieutenant-Governor of Nova Scotia, Major-General the Honourable E. C. Plow, and Mrs. Plow.

WALTER K. HOUSE

ABSTRACTS *from current literature*

MEDICINE

Depressive Reactions in Hypertensive Patients on Rauwolfia and in Controls.

R. M. QUETSCH *et al.*: *Circulation*, 19: 366, 1959.

In a review of 387 resident patients with arterial hypertension who were treated over a period of two years, it was found that of 202 patients who were treated with some form of *Rauwolfia serpentina*, 53 (26%) experienced a depressive reaction. In contrast, a comparable control group of 185 hypertensive patients who received no antihypertensive medication produced only nine instances (5%) of depression. The evidence did not indicate any relationship of depression to severity of hypertension, to drugs other than rauwolfia, or to the efficacy of treatment in lowering blood pressure. In addition no correlation could be found between depression and the age or sex of the patient, or with any complicating disease.

Depression occurred in more than half of those persons who had a history of depression before begining treatment with rauwolfia and in almost a fourth of the patients without such a history. Patients taking *Rauwolfia serpentina*, whether as whole root extract, alseroxylon fraction or reserpine, require close observation indefinitely for any evidence of mental depression.

In view of the frequency and severity of depressive reactions among hypertensive patients treated with rauwolfia, the physician must evaluate the indications for use of this drug with extreme care and whenever possible avoid its use altogether. S. J. SHANE

Agglutination Tests in Patients and Families with Rheumatoid Arthritis.

F. R. SCHMID: *Illinois M. J.*, 115: 331, 1959.

The author reports his experience with 140 relatives of patients with rheumatoid arthritis who were tested for the presence of the rheumatoid factor. Of the 140 relatives studied, 124 were asymptomatic and 17% of these had positive tests. This finding is statistically significant when compared with the control group of 157 persons who had a 5% incidence of positive tests. Although this investigation has to be considered as a pilot study, its findings suggest a tendency for the inheritance of the rheumatoid factor. W. GROBIN

High-Voltage QRS Complexes in the Absence of Left Ventricular Hypertrophy.

G. R. CUMMING AND W. L. PROUDFIT: *Circulation*, 19: 406, 1959.

Of an unselected group of "otherwise normal" electrocardiograms in which the sum of S in V_1 and R in V_5 exceeded 35 mm., 39% came from patients with no clinical evidence of cardiac disease. Similarly, 29% of electrocardiograms in which R in aV_1 exceeded 11 mm. were from patients without cardiac disease. All of the patients in whom the voltage was abnormal in lead aV_1 and the precordial leads had evident or possible heart disease. While the voltage indexes for left ventricular hypertrophy presented by certain workers are useful and easy to apply, the lack of specificity of voltage changes seriously limits the clinical application. S. J. SHANE

Trauma and Rheumatism.

L. GELFAND AND R. MERLISS: *Ann. Int. Med.*, 50: 999, 1959.

Trauma may cause cracking or fibrillation of the intra-articular cartilage, with subsequent atrophy, and it may scar or weaken the intra-articular and extra-articular supporting structures, thereby decreasing the ability of the joint to withstand the physiological injury that results from motion and weight-bearing. It also appears that, although the association is rare, rheumatoid arthritis may be precipitated by trauma. More commonly, however, pre-existing rheumatoid arthritis is aggravated by injury. Nevertheless, traumatic arthritis is a direct result of injury to the articular and peri-articular structures of a joint. Systemic hypertrophic arthritis may be aggravated by injury. Frequently, asymptomatic hypertrophic arthritis becomes painful after trauma.

As is well known, gout may be precipitated by even minor injuries. On the other hand, a spontaneous attack in a joint may be so violent and associated with such evident signs of inflammation as to simulate an injury when none has occurred.

Periarthritis of the shoulder may result directly from trauma to the shoulder, or indirectly as a result of therapeutic immobilization of the arm. The disability is greatly increased if neurovascular dystrophy of the hand results. S. J. SHANE

Clinical and Laboratory Significance of Serotonin and Catechol Amines in Bananas.

J. R. CROUT AND A. SJOERDSMA: *New England J. Med.*, 261: 23, 1959.

Attention is drawn to the finding that ingestion of bananas produces an increased urinary excretion of 5-hydroxyindoleacetic acid (5 HIAA) and of norepinephrine and 3,4-dihydroxyphenylethylamine (dopamine). Assuming that the fate of these amines when ingested in bananas is the same as that of the pure compounds given orally, it was calculated that an average banana contains 3.7 mg. of serotonin, 0.25 mg. of norepinephrine and 1.0 mg. of dopamine. It is therefore possible that the ingestion of a banana may increase 5 HIAA excretion enough to alter the results of a test and to suggest falsely a diagnosis of malignant carcinoid and similarly to raise the catechol amine excretion to levels compatible with those in phæochromocytoma.

W. GROBIN

Polycythæmia and Hydronephrosis or Renal Tumours.

J. H. LAWRENCE AND W. G. DONALD, JR.: *Ann. Int. Med.*, 50: 959, 1959.

The literature on simultaneous occurrence of polycythæmia and hypernephroma as well as other renal lesions is reviewed. Two additional cases of polycythæmia with hypernephroma and two cases of polycythæmia with unilateral hydronephrosis, one with a fibromyxosarcoma, are also reported. Recent experimental work which indicates that there is a humoral erythropoietic factor, possibly produced by the kidney, is briefly reviewed. The occurrence of polycythæmia with hypernephroma and other renal lesions, and particularly the maintained correction of the polycythæmia after nephrectomy in several cases, provides clinical support for the assumption that the kidney may be a possible source of, or be essential to the activation of, a humoral erythropoietic factor. S. J. SHANE

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Prophylaxis of Thrombosis and Treatment without Anticoagulants (*in German*).

C. THEOPHANIDIS AND J. KARANTANIS: *Deutsche med. Wchnschr.*, 84: 903, 1959.

The reports by K. Sigg on the good results of prevention and treatment of thrombosis and embolism with butazolidine encouraged the authors to undertake this method of treatment and in accordance with his recommendations and those of others the following routine was carried out in recent years. Butazolidine was given to protect the vessel wall and a compression bandage was applied from toes to groin in patients about to be confined or about to undergo a pelvic operation. In addition early mobilization of the patients was carried out. Following this routine the incidence of thrombosis in patients after gynæcological operations dropped from 2.8% to 1.8% and in patients post partum from 0.38% to 0.25%. This prophylactic treatment was given only to patients who had an indication such as varicosities, past history of thrombosis, obesity, etc. When comparing these results with those of anticoagulant prevention and treatment, the authors believe that this method has many advantages over anticoagulants and none of their disadvantages. W. GROBIN

Remission of Disseminated Coccidioidomycosis Produced by Amphotericin B.

J. A. COLWELL: *Ann. Int. Med.*, 50: 1028, 1959.

Amphotericin B produced a remission in a case of disseminated coccidioidomycosis. Evidence of effectiveness was a temporary improvement after one month of treatment, followed by a relapse which responded to 28 weeks of intravenous therapy. Toxic effects of the drug were confined to temporary elevation of the blood urea nitrogen and occasional casts in the urine. No permanent renal damage developed. There was no evidence of a toxic effect on the liver or bone marrow.

The experience in this case and a review of the literature suggest that adequate doses of amphotericin B (at least 1 mg./kg. intravenously) must be administered for a long period of time to achieve a remission in disseminated coccidioidomycosis. S. J. SHANE

Symptomatology and Treatment of Diabetic Coma (*in German*).

H. BARTELHEIMER: *Deutsche med. Wchnschr.*, 84: 897, 1959.

Just as varied as the symptomatology of compensated diabetes can be so are the various forms of its decompensation. From the mildest it can run all the gamut of severity to that of diabetic coma. Depending on the most prominent symptoms and signs the following forms are distinguished: the dyspnœic, the cardiovascular, the pseudo-paralytic or pseudo-peritonitic and the renal. Frequently, however, these forms overlap. The precipitating cause of each case of coma should be sought out if at all possible. From personal observation the author concluded that in some 50% of coma febrile illness was responsible. Frequently the diabetes had not been previously suspected. Severe arterial, cerebral or coronary artery disease may precipitate coma. The tendency to diabetic acidosis varies in individual patients and is most pronounced in the juvenile diabetic. It is least frequent in diabetes of old age and it is worth while to distinguish this from the long-standing diabetes in older people. Although full-blown diabetic coma is rare nowadays, pre-coma is encountered quite frequently, and should be treated just as intensively. Success of treatment depends not only on the intensity of administration of insulin but also on the duration of the presence of acetone. Treatment should follow a definite plan according to laid-down rules. Because of its seriousness and of the present-day involved methods of treatment the author suggests that all cases of diabetic coma should be concentrated in a few specialized centres, which are fully equipped to handle this emergency.

W. GROBIN

Epidemiological and Clinical Observations in Sarcoidosis.

M. M. CUMMINGS, E. DUNNER AND J. H. WILLIAMS, JR.: *Ann. Int. Med.*, 50: 879, 1959.

The geographical concentration of sarcoidosis in male U.S. veterans is predominantly in the eastern United States. The distribution of cases correlates well with that of the pine forests in the U.S.A. Most of the 1700 patients with sarcoidosis diagnosed between 1949 and 1956 were born in rural areas. The communities with the highest prevalence rates had lumbering and forest products as principal industries. The disease occurred 12 times more often in Negroes than in whites. The conditions most frequently confused with sarcoidosis were tuberculosis, carcinomatosis and Hodgkin's disease. A follow-up study reveals that 15% of the veterans died within a five-year period. The most frequent cause of death was cor pulmonale. Active tuberculosis was not uncommon. Certain laboratory findings suggest to the authors that pine pollen may be added to the list of suspected agents thought to be responsible for sarcoidosis. S. J. SHANE

Blood Pressure Studies in Rural and Urban Groups in Delhi.

S. PADMAVATI AND S. GUPTA: *Circulation*, 19: 395, 1959.

The blood pressures of 1132 persons of low- and 224 persons of high-income groups were studied in this investigation. The variation of blood pressure with age and body weight was determined. In the low-income groups there was practically no rise in systolic and diastolic blood pressure with age, except a constant small rise among women, but there was a marked rise in both systolic and diastolic blood pressure with increase in body weight.

In the high-income groups the body weight and blood pressures, systolic and diastolic, were higher in every decade than in the low-income groups. There was a consistent rise in blood pressure with both age and body weight. There was a steady weight gain with age among the upper classes that was strikingly absent among the rural and industrial groups.

Low-income groups in every decade had lower systolic pressures than in Western countries; the diastolic pressures, however, were lower only after the age of 40. The high-income groups had slightly higher systolic pressures up to age 30, after which the American figures were higher. The diastolic readings were higher throughout among the better-class Indians. The incidence of blood pressures over 140/90 mm. Hg was remarkably low among all classes of Indians in all decades.

The conclusion is drawn that the lower blood pressure among the low-income groups was the result of lower body weight and an absence of the weight gain with age, which occurs among Western peoples who are economically better off. S. J. SHANE

SURGERY

Is Appendicitis Decreasing in Frequency?

K. B. CASTLETON, C. B. PUESTOW AND D. SAUER: *A.M.A. Arch. Surg.*, 78: 794, 1959.

The death rate from appendicitis has been decreasing. Operations for acute appendicitis and non-acute appendectomies have decreased in big city hospitals and in town and country hospitals, both in the proportion of total operations done and in actual numbers. The crude annual death rates for appendicitis among Metropolitan Life Insurance Company policyholders declined from 10.9 per 100,000 in 1901 to 2.2 in 1949.

It is doubtful whether antibiotics, diet, better diagnosis, and improved surgical and anæsthetic techniques have much to do with this decrease in appendectomies. In an average hospital the ratio of appendectomies to the total number of operations done has declined from 10% in 1941 to 2% in recent years. It is not unlikely that the whole picture represents a cyclical decrease such as is seen in other diseases. The suggestion that fewer appendectomies are done because of the advent of tissue committees is doubtful. The incidence of appendiceal abscesses seems to be increasing.

BURNS PLEWES

"Grease-Gun" Injury.

R. HARRISON: *Brit. J. Surg.*, 46: 514, 1959.

Twenty-four hours after an accident with a high-pressure grease gun a 27-year-old native of Jamaica attended hospital for severe pain in his left index finger. For the first two weeks after his first visit to the casualty department it was not appreciated that what had happened was that he had accidentally injected grease under pressure into the index finger. Several injections of penicillin were given without any beneficial results. Finally operation was performed and some 3-4 c.c. of oily material removed from the finger. When seen three months later he had regained almost full movements of his finger and there was only some slight tenderness on its dorsal aspect. Reference is made to other reported cases in the literature and to the general agreement that operation is the treatment of choice. Surprise is expressed that accidents of this variety do not occur more often. Posters indicating the hazard of handling these guns are suggested as a preventive in order to avoid similar accidents.

W. GROBIN

Recanalization of a Thrombosed Portal-caval Anastomosis Using Heparin (*in French*).

J. COUNIOT, J. P. GAROBY AND A. MALAVAUD: *Lyon chir.*, 55: 25, 1959.

A case is described in which heparin was demonstrated, by repeated splenovenograms, to recanalize a thrombosed portal-caval anastomosis. The patient was referred because of ascites, splenomegaly and abnormal liver function tests. In February 1957, percutaneous splenography revealed an elevated intrasplenic pressure (32.0 cm.) and a patent splenic and portal vein.

A portal-caval anastomosis was carried out by Welsh's technique, using the left lateral position and resecting the 11th rib. An auricular clamp was used on the inferior vena cava and end-to-side anastomosis performed. The entire procedure took one and a half hours.

On the seventh postoperative day another splenovenogram was made because temperature and pulse rate were elevated and the abdomen was distended. The intrasplenic pressure was 45.0 cm. and the splenic vein was visible for only a short distance.

The patient was then given antibiotics and heparin. Tromexan was later substituted and given for six days. Seventeen days after operation a third splenovenogram was made. The splenic pressure was now 28.0 cm. and the splenic vein was well visualized. On the 24th postoperative day the procedure was repeated and the splenic and portal veins could be seen. The ascites and œdema which had been present on the seventh postoperative day had disappeared.

Intrasplenic pressures were again recorded at 28.0 cm. in August and January of 1958. The authors advise against unclamping the inferior vena cava quickly after the anastomosis is made. In their case, an alarming arrhythmia developed when this was done. The usual difficulty of freeing the portal vein is noted.

T. A. MCLENNAN

A Simple Method of Topical Laryngo-Tracheo-Bronchial Anæsthesia.

T. E. STARZL AND E. P. CRUZAT: *J. Thoracic Surg.*, 37: 651, 1959.

The method described employs the same principle as transtracheal anæsthesia, in which the topical agent is introduced into the trachea, and disseminated into both upper and lower air passages by respiration and coughing. Certain advantages are apparent in this method, however, including the avoidance of needle puncture of the trachea and the opportunity of injecting the drug slowly.

The routine use of the described technique has considerably reduced the period of preparation for bronchoscopy or bronchography. In almost every instance the patient is ready for study within five or ten minutes after arrival in the operating room. A number of patients in this series had had previous bronchoscopy or bronchography after the induction of topical anæsthesia by the usual means. Without exception, these patients have expressed a preference for the method described.

S. J. SHANE

Cancer Cells in the Blood.

H. C. ENGELL: *Ann. Surg.*, 149: 457, 1959.

The presence of tumour cells in the blood during surgical resection of the tumour area has been found to be more related to the histological differentiation of the tumour, and to a lesser degree to local extension, while surgical trauma seems to be of little consequence in the venous spread of cancer cells from colon and rectal carcinomas. It might be that trauma is an important factor in richly vascularized tumours where central veins, such as the renal or pulmonary, often are invaded. In a series of examinations done in Copenhagen, 76% of Grade 3 and 100% of Grade 4 cancers showed malignant cells in the blood. Of the patients who survived five to nine years, 51% had tumour cells in the blood stream at the time of operation. Intravascular destruction of morphologically intact and active tumour cells occurs. But the chance of preventing fatal tumour cell embolism which might metastasize justifies attempts to ligate vessels before touching the tumour. It seems doubtful that such measures will influence survival rate in a statistically significant degree.

BURNS PLEWES

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THERAPEUTICS

Short-Term Hormone Therapy: Its Effect in Active Rheumatic Carditis of Varying Duration.

M. G. WILSON AND W. N. LIM: *New England J. Med.*, 260: 802, 1959.

Treatment of acute rheumatic carditis with steroids is reviewed and results in 47 children during 53 attacks of active carditis are reported. Only patients with clinical evidence of progressive carditis were included. Twenty-six attacks were presumed initial and 27 were recurrent. The steroids used included hydrocortisone, prednisone, prednisolone and methylprednisolone. The steroid was administered every six hours for a period of seven days and stopped abruptly. The daily steroid dosage was based on the circulating eosinophil response each morning; this was estimated four hours after steroid administration, a rise above 10 per c.mm. indicating inadequate therapy.

Progressive clinical symptoms and signs of active carditis were arrested within 24 to 72 hours of institution of therapy in all patients. Follow-up studies indicated that there was no residual cardiac damage in patients treated early in their initial attacks of acute rheumatic carditis. No increase in cardiac damage was evidenced in patients with recurrent attacks of rheumatic carditis if therapy was instituted early after the clinical manifestation of recurrence. In the patients whose rheumatic carditis had been active for over 21 days, permanent cardiac damage might have resulted but further progression was stopped by treatment.

The authors conclude that short-term steroid therapy (adequate dosage for seven days) is of great value in the treatment of rheumatic carditis. It should be started early in the illness, as delayed treatment may allow the development of some permanent cardiac damage. Long-term therapy of rheumatic fever with steroids is not indicated. NORMAN S. SKINNER

Use of Buccal Trypsin in Two Diabetics with the Nephrotic Syndrome.

R. NEUBAUER, J. ESPOSITO AND A. SINDONI: *Am. J. M. Sc.*, 237: 559, 1959.

Large doses of buccal trypsin (30 mg. daily) may be safely administered over a period of months without significant toxicity. Two diabetics with the nephrotic syndrome experienced marked clinical and laboratory improvement with the administration of buccal trypsin in large doses over a prolonged period. The clearing of infection may play a role. Primary insulin deficiency in the diabetic and the addition of a pancreatic enzyme provokes speculation. Much more study is warranted both in renal infection and in the entire infected nephrotic stage of renal failure. S. J. SHANE

NEUROLOGY

Periodic Migrainous Neuralgia.

E. R. BICKERSTAFF: *Lancet*, 1: 1069, 1959.

This special type of headache is also known as cluster headache or autonomic facial cephalgia. It had at one time been described by Horton as histamine cephalalgia. Its most successful treatment is with ergotamine tartrate as described by Symonds; 0.25 mg. of ergotamine tartrate given by injection three times daily for five days out of each week can prevent or cut short the attacks of pain. Of Bickerstaff's own series of 16 patients 12 obtained complete relief of symptoms from the first full day of injections. Only in one patient did the injections fail to bring relief. A study of the present series and of those of other authors convinced Bickerstaff that there is enough evidence at least to support the suggestion that the syndrome of cluster headache is a variant of the migraine symptom complex. Long-continued administration of ergotamine tartrate is efficient and safe and seems to be the most certain method of treatment of this condition at the present time. W. GROBIN

INDUSTRIAL MEDICINE

Medical Examination for Public Safety.

P. A. B. RAFFLE: *Brit. J. Indust. Med.*, 16: 98, 1959.

The criteria of fitness to drive a passenger vehicle are physical capability to handle controls for prolonged periods, good eyesight, and absence of conditions liable to cause sudden collapse or excessive fatigue with consequent liability to accidents. Three factors which tend to be forgotten are idiopathic epilepsy, which may first appear in middle life; carcinoma of the bronchus, which may cause fits; and syncope due to coughing. In the experience of the London Transport now reported the medical standards for bus driving in London are briefly restated. Some preliminary information is presented on the clinical conditions most frequently recorded as the reason for exclusion from driving, determined by the doctors of this organization.

The pre-employment medical examination is only one of the methods by which doctors can help to maintain and increase the safety of the public. The frequency of the routine medical examinations of the London Transport drivers follows a schedule. In addition drivers are examined at their own request or at the request of their doctors.

Results of clinical pre-employment examinations of 18,003 applicants during the years 1950-57 are shown. All applicants had had experience in driving heavy vehicles and were otherwise acceptable as drivers. Of these 5.3% were rejected on general medical grounds, and a further 13.3% for sub-standard vision and colour vision. Continued surveillance during working life, especially after sickness absence, produced further information as indicated by analysis of the cases found unfit during 1956. Among bus drivers who had been off sick for 28 days or more, or for certain specified conditions, 23% of the examinations resulted in temporary or permanent exclusion from driving. This compares with 1.5% of examinations for licence renewal and 5.7% at age 65 and above.

The conditions contributing to rejection of the cases found unfit during 1956 included functional and organic nervous disorders, bronchitis, diabetes, disease of the circulatory system, hypertension and coronary heart disease. The cardiovascular conditions accounted for 26% of the cases, one-third being due to hypertension and one-half to coronary heart disease. The latter were generally revealed by sickness absence. No one who has had clinical coronary heart disease is allowed to drive a London Transport bus.

The experience of this company indicates that the standards adopted are practicable and effective and that in the maintenance of public safety the careful assessment of fitness after sickness is as important as routine medical examination. MARGARET H. WILTON

BOOK REVIEWS

STEROIDS. Louis F. Fieser, Sheldon Emery Professor of Organic Chemistry, and Mary Fieser, Research Fellow in Chemistry, Harvard University. 945 pp. Illust. Reinhold Publishing Corporation, New York, 1959. $18.00.

The first three editions of this work, under the title "Natural Products Related to Phenanthrene", were monographs of the American Chemical Society dealing with the family of compounds structurally descended from hydrophenanthrene, and including such diverse substances as morphine, digitalis, vitamin D, steroids and resin acids. The tremendous clinical interest in corticosteroids during the past decade, spurring the research on discovery and synthesis of new steroids and analogues, has resulted in a complete revision of this book.

In keeping with the altered title, the chapters on quinones and morphine alkaloids and on resin acids have disappeared while the chapters on adrenocortical steroids have been greatly expanded. New chapters have been added on the newer methods of physical characterization, and on general methods of steroid chemistry, of relevance to the commercial synthesis of steroids from sterol precursors. The short chapter on steroid metabolism in the previous edition has been much enlarged, and broken down into separate sections included in the chapters on the respective steroids. A valuable new feature is the extensive use of simulated three-dimensional diagrams to illustrate the steric configuration of the molecules. These diagrams are far superior for this purpose to the conventional structural formulæ. Another addition, a choice stroke of one-up-manship, is the inclusion of a letter from Butenandt to one of the authors (pp. 446-448) in German, without translation.

The name, however, is an unfortunate one; "Chemistry of the Steroids" would be more appropriate. The sections on metabolism and biosynthesis tend to be somewhat scanty, with much emphasis on the chemical proofs of structure of the intermediates. Except for a few very brief references, there is no discussion of quantitative analytical methods. Clinical and experimental endocrinologists and clinical chemists are likely to have little use of this book, but it will undoubtedly continue to be a standard reference work for biochemists, pharmaceutical chemists and others interested in steroid chemistry.

SYNOPSIS OF EAR, NOSE AND THROAT DISEASES. Robert E. Ryan, Department of Otolaryngology, St. Louis University School of Medicine, St. Louis, Mo.; William C. Thornell, Assistant Professor of Otolaryngology, University of Cincinnati; and Hans von Leden, Chicago. 383 pp. Illust. The C. V. Mosby Company, St. Louis, Mo., 1959. $6.75.

It has become apparent recently that there is a need for information on ear, nose and throat diseases at the level of the general practitioner and student. Such a need is quite a real one, as the ordinary textbook of otolaryngology is far too detailed to be used by or advised for students or interns not specifically interested in ear, nose and throat work. The authors of this book have successfully developed such a source of information.

The general plan of the book presents the various areas in an organized manner. In each case the anatomy of the area is clearly and concisely described and there are excellent illustrations. This is followed by a discussion of physiology, and then a description of the common diseases and disorders, concisely described and briefly developed. There has been no attempt to describe the controversial methods of treatment or concepts of pathology or pathogenesis, but the commonly accepted and yet up-to-date teaching on all these subjects has been outlined.

For the student, the authors have also done very well in that each major disease or pathological process when described is followed by a summary in which the symptoms, complications, treatment and prognosis are all laid down point by point. This allows for a rapid review of the subject.

The entire field is covered in something more than 300 pages and this allows for a review of the whole area within a reasonable time. There is no bibliography, but this is properly omitted in a publication of this type.

Most teachers in this field would gladly recommend this volume to their students as a very worth-while and completely adequate source of information in the field of ear, nose and throat.

DERMATOLOGIE UND VENEROLOGIE: EINSCHLIESSLICH BERUFSKRANKHEITEN, DERMATOLOGISCHER KOSMETIK UND ANDROLOGIE (Dermatology and Venereology: Vol. III, Part I: Including Occupational Diseases, Cosmetic Dermatology and Genital Disorders in the Male). Edited by H. A. Gottron and W. Schönfeld. 695 pp. Illust. Georg Thieme Verlag, Stuttgart, W. Germany; Intercontinental Medical Book Corporation, New York, 1959. $39.30.

In this volume of 20 chapters, with over 300 illustrations, the subject of burns, frostbite and other changes in the skin due to thermal action is dealt with comprehensively and in a well-organized manner by Zelger and Hochleiter. It includes a well-written discussion on the management of shock and a section dealing with electrical burns. Zelger in a special chapter also discusses skin changes caused by caustic agents and war gas, and Hochleiter presents a short chapter on foreign bodies causing cutaneous reactions, including tattoos.

Prof. Mayr discusses self-inflicted lesions, and this portion is very well illustrated. Prof. Wulf gives an excellent and exhaustive review of the whole field of light dermatoses. The section on peripheral vascular disturbances by N. Kluken is excellently organized and well illustrated. A special chapter by Greither is devoted to varicose veins and the problem of stasis and one by Böhm to anal pathology, anal fissures and hæmorrhoids. In these chapters most of the therapeutic procedures discussed would, on this continent, fall into the field of surgical specialties. Nevertheless, a dermatologist may profit greatly by study of these well-written treatises.

Fleck presents an exhaustive review of the literature on urticaria, including strophulus, prurigo and angioneurotic œdema. In this and most of the preceding chapters an adequate bibliography is given, but non-German references are quoted from German abstracting journals rather than the original articles, which reduces the usefulness for the North American reader.

Phytogenic dermatoses are described in detail by Reith, and drug eruptions by Lindemayer, who presents useful tables listing the typical reactions to each drug. Prof. Speir reviews the various methods of

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cutaneous testing and discusses the significance of the results, and Prof. Storck discusses the difficult field of immune reactions of the skin in a concise and lucid manner.

The important subject of eczematous disorders is dealt with rather briefly. The German school differentiates contact dermatitis, atopic and seborrhœic dermatitis, and lumps all other eczematous reactions together under the heading of "eczema vulgare" which includes contact dermatitis; all this is somewhat confusing to the Canadian reader, as is the different nomenclature. Contact dermatitis is treated adequately by Wagner, and eczema vulgare by Halter. This latter chapter contains interesting discussions on special questions such as the skin and nervous system and presents a good review of the literature. However, it is too short to cover this complicated field comprehensively.

Atopic dermatitis (endogenous eczema) is discussed by Korting, who deals chiefly with the pathogenesis and the mechanism of this disorder. The clinical and therapeutical part is disappointingly short and incomplete and the few illustrations do not measure up to the standard of those in preceding chapters. Gottron writes a short but masterly treatise on lichen simplex chronicus and Leonardi deals adequately with seborrhœic dermatitis. The last chapter, written by Groetschel, discusses the medico-legal aspects of the occupational dermatoses with reference to German law.

The amount of data and information collected in this volume is imposing. Like the previous ones, it will be a valuable addition to any medical library.

INTERNATIONAL TEXTBOOK OF ALLERGY. Edited by J. M. Jamar, Lecturer at the University of Louvain, Belgium. 639 pp. Illust. Charles C Thomas, Springfield, Ill.; The Ryerson Press, Toronto, 1959. $17.50.

The scope of allergy, as of most branches of medicine today, has become so wide that no one writer can cover the entire field with authority. To overcome this difficulty a group of allergists from various countries collaborated to write this textbook.

Its contents cover the field of allergy fairly completely. The initial chapter discusses the basic experimental aspects of anaphylaxis, histamines and immunology. This is followed by a discussion of the concept of allergy as it has developed historically, its prevalence and predisposing and contributory factors. The remainder of the book is devoted to the more clinical aspects of allergy. Allergy of the upper respiratory tract and asthma are given the extensive coverage they deserve. Of particular note here are chapters on the provocation tests, the use of corticotrophin and adrenocortical steroids, the antihistamines, and psychosomatic aspects and psychotherapy in allergic disease. There are chapters on allergic disease of the skin, urticaria, alimentary and gastro-intestinal allergy, allergy of the eye, vascular allergy and collagen diseases, allergy and hæmatology, pædiatric allergy, migraine, and drug reactions.

In general, this is an excellent textbook on allergy. It is well edited, readable, and written by sound and competent authorities. Because of the number of contributors there is a certain lack of unity and because of the need to exercise selectivity in subject matter there are some gaps and omissions. It does give however a good general picture of the field of allergy as it stands today.

THE ANASTOMOSES BETWEEN THE LEPTOMENINGEAL ARTERIES OF THE BRAIN: THEIR MORPHOLOGICAL, PATHOLOGICAL AND CLINICAL SIGNIFICANCE. Henri M. vander Eecken, Professor of Medical Psychology and Agrégé in Neurology, Faculty of Medicine, University of Ghent, Belgium. 160 pp. Illust. Charles C Thomas, Springfield, Ill.; The Ryerson Press, Toronto, 1959. $8.50.

This little monograph is now made available in English in a creditable translation from the original Flemish by the author himself. The work that is described is of great importance to neurologists, neuro-anatomists and neuro-pathologists and they will be grateful to Dr. vander Eecken. In spite of the wishful statement by the publisher that the book is addressed to (among others) general practitioners, physicians in general probably will be satisfied to assimilate the details of new and important information as they creep into the standard textbooks and teaching.

HOW TO LEARN MEDICINE. A. E. Clark-Kennedy, Consulting Physician to the London Hospital and formerly Dean of the Medical School, London, England. 227 pp. Faber & Faber, London; British Book Service (Canada) Ltd., Toronto, 1959.

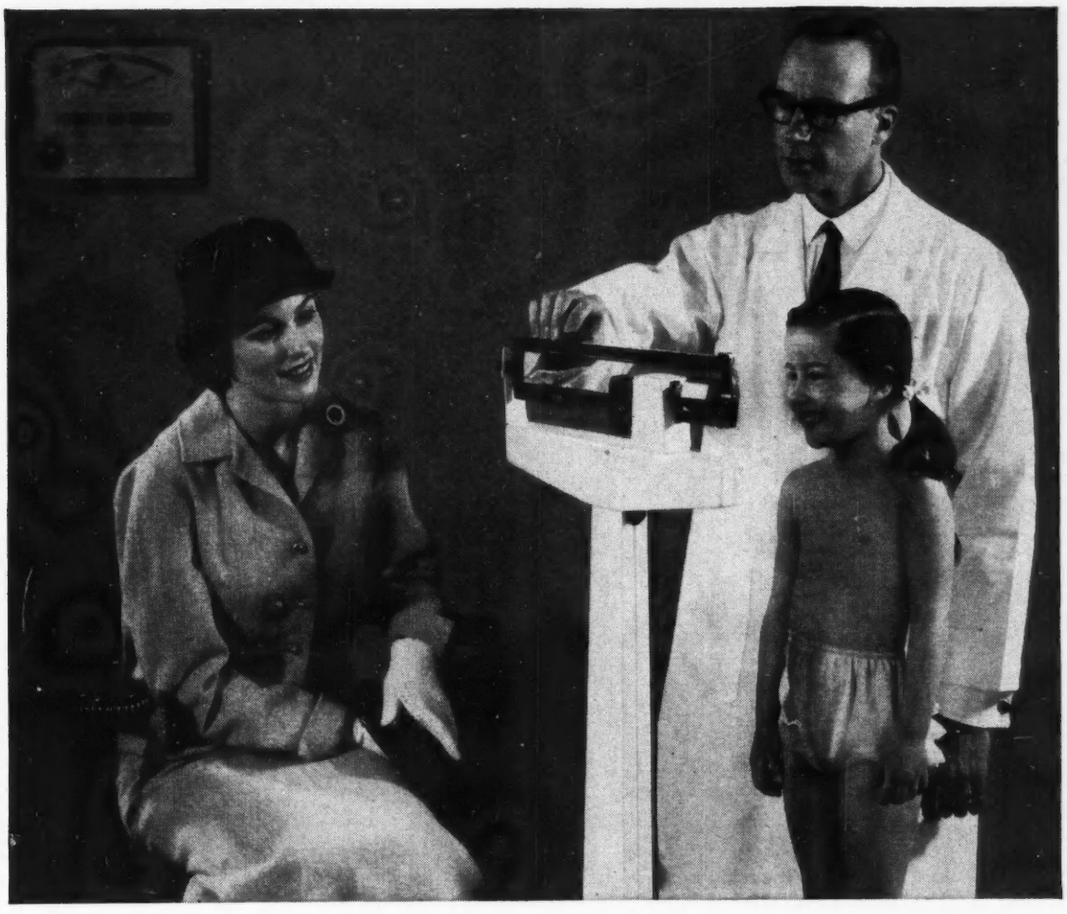
Older persons reading this book may well ask themselves whether the medical student really needs to be given all the advice contained in it. Does the entrant to a medical school really need to be told in very simple terms what the scientific method is and what the sciences of chemistry, physics and biology mean to medicine? In fact, were it not for the author's statement that the students do indeed need this help, one might question the value of telling intelligent young men how to organize their lives in a medical school.

However, Dr. Clark-Kennedy has been teaching students for many years and presumably knows his audience. The book is really a compound of several things—very helpful hints on the approach to study and approach to examinations, general advice on how to run one's life, and an elementary exposition of the medical curriculum. The whole is presented in a chatty and informal style, and of course inevitably contains a few things which will be of no value to the Canadian student, such as the advice not to work in the vacation unless one has to. This book should appeal particularly to the less gifted student.

NOTABLE NAMES IN MEDICINE AND SURGERY. Hamilton Bailey and W. J. Bishop, London, England. 216 pp. 3rd ed. H. K. Lewis & Co. Ltd., London, 1959. £1. 15s.

In spite of occasional efforts to suppress them as unscientific, eponyms still abound in medicine and it is unlikely that the better-established among them, such as the Wassermann reaction, will ever be abolished. This edition of *Notable Names in Medicine and Surgery* contains short biographies, full of information and delight, of 79 persons who have bestowed their names on diseases, signs, instruments, operations, stains, and other features of the medical art. In the present edition, some changes have been made and there has been an effort to render the list less surgical and more representative of internal medicine as well. This would be an agreeable addition to any physician's or medical student's library.

(Continued on page 118)



Underweight Children Gain and Retain Weight with Nilevar®

One of the most convincing evidences of the anabolic activity of Nilevar, brand of norethandrolone, has been its ability to improve appetite and increase weight in poorly nourished, underweight children.

A highly important feature of the weight gain thus produced is that it is not ordinarily manifested by deposition of fat but as muscle tissue resulting from the protein anabolism induced by Nilevar.

Anorexia and "Weight Lag" Study—Brown, Libo and Nussbaum have reported* consistent and definite increases in rate of weight gain in eighty-six patients, ranging in age from 7 weeks to 15½ years. This beneficial action of Nilevar was observed in the patients with organic and traumatic disorders as well as those whose only complaints were poor appetite and/or persistent failure to gain weight.

In this study, the weight gained was not lost after discontinuance of Nilevar therapy although many patients did not continue the sharp gains effected by the drug.

The authors are of the opinion that Nilevar is a highly useful anabolic agent for influencing weight gain in underweight children.

When Nilevar is administered to children a dose of 0.25 mg. per pound of body weight is recommended and continuous dosage for more than three months is not recommended.

Nilevar is supplied as tablets of 10 mg., drops of 0.25 mg. per drop and ampuls of 25 mg. in 1 cc. of sesame oil. Further dosage information in Searle Reference Manual No. 4.

G. D. SEARLE & CO. OF CANADA LTD.
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*Brown, S. S.; Libo, H. W., and Nussbaum, A. H.: Norethandrolone in the Successful Management of Anorexia and "Weight Lag" in Children, Scientific Exhibit presented at the Annual Meeting of the American Academy of Pediatrics, Chicago, Oct. 20-23, 1958.

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(Continued from page 114)

NEUROPHARMACOLOGY. Transactions of the Fourth Conference, September 25, 26 and 27, 1957. Edited by Harold A. Abramson, Biological Laboratory, Cold Spring Harbor and State Hospital, Central Islip, N.Y. 285 pp. Illust. The Josiah Macy Jr. Foundation, New York, N.Y., 1959. $5.00.

This is the fourth report of a series of neuropharmacological conferences sponsored by the Josiah Macy Jr. Foundation. This verbatim report is most interesting to the reader because of the remarkable variation in the communications. This reviewer has followed the Macy reports for some years but did not understand their form until he participated in one last spring.

The basic method is to gather a group of men who have a common interest in a particular problem—in this instance, newer advances in neuropharmacology. The group is balanced in composition by including scientific pioneers, critics and neutral fillers who keep the first two groups from chewing each other up. Four scientists, usually pioneers, are invited to act as discussion leaders. They are sitting targets for the members of the conference. The theme of the meeting is communication, and the conference members know the names of the leaders in advance. They come prepared to (1) be as critical as possible of the leader, (2) read into the record a report of their own—usually as an interruption. (The art of interruptmanship should be cultivated.)

The communications therefore include formal presentations of high quality by discussion leaders, formal but brief reports by others also of good quality, and finally questions and frontal and aside remarks. The latter are chiefly valuable in indicating the frame of reference of the speaker and often contain sweeping and erroneous statements that would not have been made by the same author in scientific papers.

The present transactions record four discussions. In the first, Harold Abramson, a skilful leader, reported that certain respiratory poisons produced the same changes in behaviour of Siamese fighting fish as did LSD-25. His group have developed a bioassay for LSD-25 and some similar compounds by measuring these behavioural changes.

Robert Heath, the discoverer of taraxein, was the next target. He reviewed his research at Tulane University which led to the isolation of this protein. Taraxein is a protein extracted from schizophrenic serum. When it is injected rapidly by vein into normal volunteers, they suffer a temporary psychosis which remarkably resembles schizophrenia. Monkeys are made catatonic and suffer marked changes in their depth encephalograms. Many heavy guns were trained upon Heath and he seems to have come off badly. Today (two years later) there is much more substantial confirmation of his claims by workers in Russia, Sweden and the U.S.A.

The third leader, John Lilly, reported the effect of stimulating certain parts of the brain on animal behaviour. The final leader, Gordon Alles (discoverer of amphetamine) has for years swallowed his own chemicals to test them for euphoriant activity. One day several years ago he took a few milligrams of a new substance and continued to work at his desk as usual. About an hour later he found himself to his great surprise up in a corner at the ceiling of his office looking down at himself working at his desk (an out of the body experience). This substance is an adrenaline-like substance with the two hydroxyl groups side by side linked by a methylene bridge. This was the gist of his report. It indicates that adrenaline-like chemicals have most unusual central properties when their pressor activity is removed by binding the hydroxyls. It may also be done by altering the aliphatic chain or by converting the compound into an indole.

The reader will spend an enjoyable evening going over this book, which certainly should be in his library.

ORTHOPÆDIC SURGERY. Sir Walter Mercer, Professor Emeritus, Orthopædic Surgery, University of Edinburgh. 1075 pp. Illust. 5th ed. Edward Arnold (Publishers) Ltd., London, England; The Macmillan Company of Canada Limited, Toronto, 1959. $15.25.

The newest edition of Mercer's well-known text remains unchanged in general outline. However, the chapters on general affections of the skeleton, affections of the foot, arthrodesis and arthroplasty and affections of the soft tissues contain much new material which brings the book up-to-date. As in previous editions, the text is lucid and the illustrations are of good quality. The author skilfully combines the basic information required by undergraduates with the many technical details of interest to senior students, thus continuing the reputation of this book as one of the standard references in its field.

THE CHILD WITH A HANDICAP. Edited by Edgar E. Martmer, Children's Hospital of Michigan. 409 pp. Illust. Charles C Thomas, Springfield, Ill.; The Ryerson Press, Toronto, 1959. $12.00.

This aim of the book is "to see that every child is cared for in such a manner as to assure recovery whenever possible, to secure the greatest degree of improvement when complete recovery is impossible and to assist the child to make a satisfactory adjustment to society, to his family and to his environment."

The book has been planned to appeal to a very wide audience. The contributions covered in this book are varied and a total of 27 contributors have written individual chapters. Unfortunately, as in so many books of this type, the quality of the chapters varies greatly. Some authors present the material in considerable detail, some write for the physician, some present the material in a scanty manner, and some write for the general public. Instead of being of value to many people, the book is of limited value, and one difficult to recommend for the physician, the educationalist or the parents.

ELIASON'S SURGICAL NURSING. L. Kraeer Ferguson, Professor of Surgery, Graduate School of Medicine of the University of Pennsylvania, and Lillian A. Sholtis, Bryn Mawr Hospital School of Nursing. 766 pp. Illust. 11th ed. J. B. Lippincott Company, Philadelphia and Montreal, 1959. $6.00.

This edition has been enlarged and revised to the great advantage of the work. The new material is valuable and well presented, and the organization of the book has also been improved by the revision. It is interesting to see a separate section on nursing in an emergency or a disaster.

The illustrations and suggested readings add greatly to its usefulness. A good book on surgical nursing.

FORTHCOMING MEETINGS

CANADA

COLLEGE OF GENERAL PRACTICE OF CANADA, Fourth Annual Scientific Assembly, Montreal, Que. (Dr. W. V. Johnston, Executive Director, 176 St. George Street, Toronto 5, Ont.) February 29-March 3, 1960.

SECTION OF GENERAL PRACTICE, B.C. DIVISION, CANADIAN MEDICAL ASSOCIATION, Eighth Annual Scientific Session, Harrison Hot Springs Hotel, Harrison, B.C. (In charge of registration: Dr. R. A. White, Oliver, B.C.) March 30-April 2, 1960.

CANADIAN ANÆSTHETISTS' SOCIETY, Western Divisional Meeting, Victoria, B.C. (Dr. W. L. Esdale, Secretary-Treasurer, B.C. Division, Canadian Anæsthetists' Society, 7476 Inverness St., Vancouver.) April 28-30, 1960.

ONTARIO MEDICAL ASSOCIATION, 80th Annual Meeting, Toronto, Ont. (Dr. Glenn Sawyer, General Secretary, 244 St. George Street, Toronto 5, Ont.) May 9-13, 1960.

CANADIAN PUBLIC HEALTH ASSOCIATION, 48th Annual Meeting, Halifax, N.S. (Dr. G. W. O. Moss, Honorary Secretary, 150 College Street, Toronto 5, Ont.) May 31-June 2, 1960.

CANADIAN FEDERATION OF BIOLOGICAL SOCIETIES (comprising the Canadian Physiological Society, the Pharmacological Society of Canada, the Canadian Association of Anatomists and the Canadian Biochemical Society), Third Annual Meeting, Winnipeg, Man. (Dr. E. H. Bensley, Honorary Secretary, Montreal General Hospital, 1650 Cedar Ave., Montreal 25, Que.) June 8-10, 1960.

CANADIAN OTOLARYNGOLOGICAL SOCIETY, (SOCIÉTÉ CANADIENNE D'OTOLARYNGOLOGIE), Annual Meeting, Jasper Park Lodge, Jasper National Park, Alberta. (Dr. Donald M. MacRae, Secretary, 324 Spring Garden Road, Halifax, N.S.) June 10-12, 1960.

CANADIAN MEDICAL ASSOCIATION, 93rd Annual Meeting, Banff, Alberta. (Dr. A. D. Kelly, General Secretary, C.M.A. House, 150 St. George Street, Toronto 5, Ont.) June 13-17, 1960.

2ND WORLD CONGRESS OF THE WORLD FEDERATION OF SOCIETIES OF ANÆSTHESIOLOGISTS, Toronto, Ont. (Dr. R. A. Gordon, Chairman of Organizing Committee, 178 St. George Street, Toronto 5, Ont.) September 4-10, 1960.

UNITED STATES

AMERICAN COLLEGE OF ALLERGISTS, Sixteenth Congress and Graduate Instructional Course in Allergy, American Hotel, Bal Harbor, Miami Beach, Florida. (American College of Allergists, 2049 Broadway, Boulder, Colorado, U.S.A.) February 28-March 4, 1960.

7TH INTERNATIONAL ANATOMICAL CONGRESS, New York. (Dr. D. W. Fawcett, Executive Secretary, Department of Anatomy, Cornell University Medical College, 1300 York Ave., New York 21, N.Y.) April 11-16, 1960.

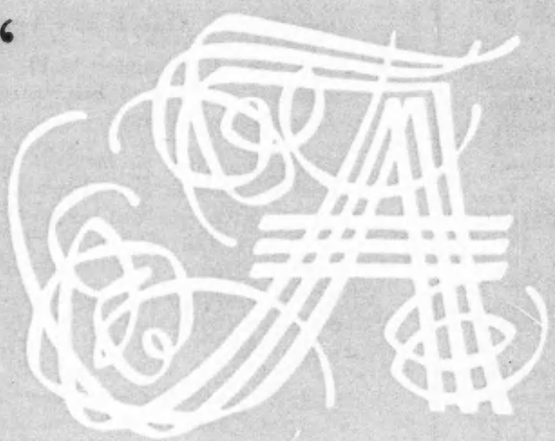
SOCIETY OF AMERICAN BACTERIOLOGISTS, 60th Annual Meeting, Philadelphia, Pa. May 1-5, 1960.

OTHER COUNTRIES

VI PAN-AMERICAN CONGRESS OF OPHTHALMOLOGY, Caracas, Venezuela. (Dr. R. G. C. Kelly, 90 St. Clair Ave. West, Toronto 7, Ont., Assistant Secretary.) January 31-February 7, 1960.

SECOND BAHAMAS SERENDIPITY CONFERENCE, British Colonial Hotel, Nassau, Bahamas. (Dr. B. L. Frank, Organizing Physician, Bahamas Conferences, P.O. Box 4037, Fort Lauderdale, Florida.) January 17-30, 1960.

FIRST BAHAMAS ALLERGY CONFERENCE, Nassau Beach Lodge, Nassau, Bahamas. (Dr. B. L. Frank; see address above.) March 5-12, 1960.

"  THOUGHT

IS AN IDEA IN TRANSIT"

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S-M-A *is the product of scientific thought*

S-M-A *moves forward with scientific achievement*

Dear Doctor:

As you know, Wyeth has been engaged in research on, development and production of the prepared infant feeding formula, S-M-A, for many years.

Nearly a half century ago, a research group began to develop a scientific adaptation of cow's milk that would simulate the milk of the human mother. Their work culminated in the S-M-A formula which was subsequently made available to physicians in 1921. It was the first successful formula patterned after human milk and the first to contain vitamins A and D.

As knowledge of infant nutrition grew, changes were constantly considered and made to bring S-M-A into line with developments, thus:

1933: We developed the procedure for isolating carotene. Carotene is now added to S-M-A in the approximate amounts found in human milk. S-M-A is the only infant formula containing carotene.
1939: Thiamine was added to S-M-A.
1942: Iron was added to S-M-A (.15 mg. per fl. oz.) to overcome the low iron content of cow's milk.
1945: As a result of protein and amino acid research, the protein content of S-M-A was increased to 1.5%.
1946: Riboflavin was standardized in S-M-A.
1947: Vitamin C was added to S-M-A. Nicotinamide was added to provide niacin.
1953: Pyridoxine hydrochloride was added to S-M-A.
1955: Equipment and production research resulted in an improved dispersion rate for speedier reconstitution.
1958: Ultraviolet sanitizing of can components was adopted; also an improved nitrogen pack to give maximum shelf life.

Among the many decisions requiring considerable study was that which demanded a carefully controlled formula which would maintain the protein content in S-M-A to provide 2.7 Gm. protein at a caloric intake of 120 calories per Kg. body weight per day. This amount is within the range of that provided by human mother's milk.

A glance at the formula shows the close parallel of the formulation for S-M-A and for mother's milk.

COMPARISON OF HUMAN MILK AND S-M-A

Approximate Analysis (Normal Dilution)

	HUMAN MILK (W/V)	S-M-A (W/V)
Protein %	0.9 -1.6	1.55
Fat %	3.1 -4.6	3.6
Carbohydrate %	6.5 -7.6	7.2
Minerals (Ash) %	0.20-0.23	0.39
Calcium %	0.033	0.056
Phosphorus	0.015	0.044
Iron %	0.00015	0.0005
Calories per fl. oz.	20	20

Vitamin Content per quart (Normal Dilution)

	HUMAN MILK	S-M-A
Vitamin A	2500 units	6000 units
Vitamin D	4.8 units	960 units
Ascorbic Acid	49 mg.	60 mg.
Thiamine	0.18 mg.	0.8 mg.
Riboflavin	0.49 mg.	1.2 mg.
Niacinamide	1.92 mg.	10 mg.
Pyridoxine	0.12 mg.	0.48 mg.
Pantothenic Acid	2.28 mg.	1.8 mg.
Vitamin B_{12}	0.49 mcg.	1.14-1.56 mcg.
Vitamin E	6.4 mg.	4.6 mg.
Inositol	500 mg.	91 mg.
Choline	102 mg.	91 mg.

S-M-A, for 39 years, has been prescribed with great success for millions of infants. There have been and will continue to be attempts to imitate the S-M-A formula. One thing you can depend on: S-M-A will continue to be in step with further advances as the science of infant nutrition goes forward.

Sincerely,
John Wyeth & Brother (Canada) Limited

S-M-A

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